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metals review

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published by the american society for metals

Volume XXVII-No. 8 August, 1954

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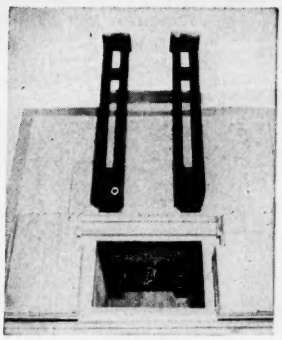
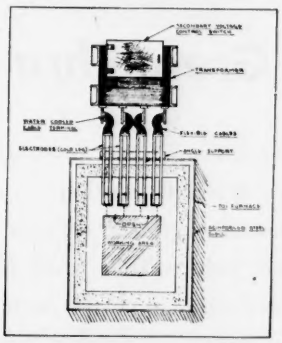
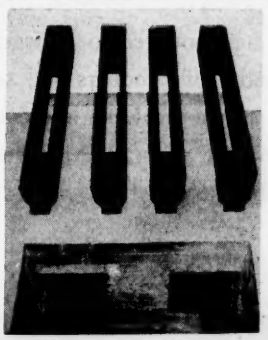


HOLDEN TYPE 701-2 Submerged Electrode Unit with removable electrodes.



Drawing of HOLDEN TYPE 701-4 Submerged Electrode Furnace.



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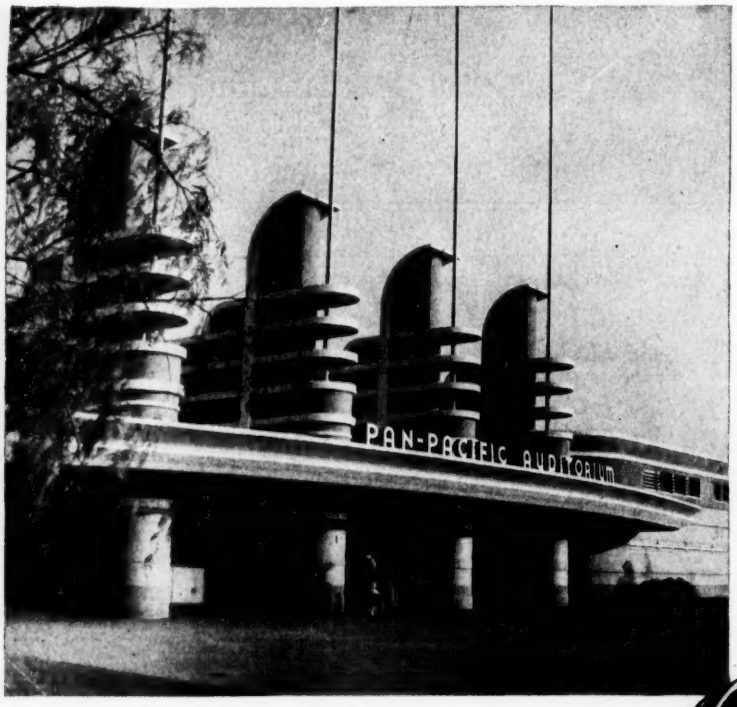

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Metals Review

VOLUME XXVIII, No. 8 August, 1954

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Invitation to Entrants

9th Metallographic Exhibit

Entries are invited in the 9th Metallographic Exhibit, to be held at the National Metal Exposition in Chicago the week of Nov. 1 through 5, 1954. Entries will be displayed to good advantage and awards will be given for the best micrographs as decided by a committee of judges.

Classifications of Micros

1. Toolsteels and tool materials
2. Stainless steels and heat resisting alloys
3. Other steels and irons, cast or wrought
4. Aluminum, magnesium, beryllium, titanium and their alloys
5. Copper, nickel, zinc, lead and their alloys
6. Metals and alloys not otherwise classified
7. Series showing transitions or changes during processing
8. Welds and other joining methods
9. Surface phenomena
10. Results by unconventional techniques (other than electron micrographs)
11. Slags, inclusions, refractories, cermets

Awards and Other Information

A committee of judges will be appointed by the Metal Congress management which will award a First Prize (a medal and blue ribbon) to the best in each classification. Honorable Mentions will also be awarded (with appropriate medals) to other photographs which, in the opinion of the judges, closely approach the winner in excellence. A Grand Prize, in the form of an engrossed certificate and a money award of $100, will also be awarded the exhibitor whose work is adjudged best in the show, and his exhibit shall become the property of the American Society for Metals for preservation and display in the Society's National headquarters in Cleveland.

All photographs may be retained by the Society for one year and placed in a traveling exhibit to the various Chapters. They will be returned to the owners in May 1955 if so desired.

Rules for Entrants

Work which has appeared in previous metallographic exhibits held by the American Society for Metals is unacceptable. Photographic prints shall be mounted on stiff cardboard; maximum dimensions should be limited to 15 by 22 in. Heavy, solid frames are not permissible because of difficulties in mounting the exhibit. Entries should carry a label on the face of the mount giving:

Classification of entry
Material, etchant, magnification
Any special information as desired

The name, company affiliation and postal address of the exhibitor should be placed on the BACK of the mount.

Transparencies or other items to be viewed by transmitted light must be mounted on light-tight boxes wired for plugging into lighting circuit, and built so they can be fixed to the wall.

Entrants living outside the U.S.A. should send their micrographs by first-class letter mail endorsed "Photo for Exhibition—May be opened for customs inspection." To be acceptable as first-class mail the package should measure no more than 35 x 45 cm. (14 x 18 in.)

Exhibits must be delivered before Oct. 15, 1954, either by prepaid express, registered parcel post or first-class letter mail, addressed to:

National Metal Exposition
International Amphitheater
43rd and Halsted Sts.
Chicago 9, Ill.

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SOUTHERN TIER	Roland E. Groethe Corning Glass Works Corning, N. Y.	A. L. Coleman Endicott Forging and Mfg. Co. Endicott, N. Y.	John B. Given I.B.M. Corp. Endicott, N. Y.	
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WORCESTER	Joseph C. Danec Norton, Behr-Manning Overseas, Inc. 1 New Bond St. Worcester, Mass.	Herbert D. Berry Thomas Smith Co. 288 Grove St. Worcester, Mass.	Ralph N. S. Merritt, Jr. Olson Mfg. Co. 100 Prescott St. Worcester, Mass.	
YORK	Raymond W. Musser 43 Manor Ave. Millersville Lancaster Co., Pa.	Roy E. Livingstone 1717 Stanton St. York, Pa.	Arthur R. Miller 983 E. Philadelphia St. York, Pa.	Paul Struhbar R.C.A. Victor Div. Lancaster, Pa.

New Officers Accept Gavels

(Left) Rhode Island Chapter's New Officers Are, From Left: J. D. Nelson, Carpenter Steel Co., Vice-Chairman; James J. Desonie, Minneapolis-Honeywell Regulator Co., Secretary-Treasurer; and James H. Hinman, Revere Copper & Brass, Inc., Chairman. Below: National President J. B. Austin presents a Past-Chairman's Certificate to John J. Jones, retiring chairman of the Rocky Mountain (Pueblo Group) Chapter, while newly elected chairman Harley H. Hartman (left) and the immediate past-chairman of the Denver Group, Robert L. Stark (right) look on

(Below-Left) At the Annual Meeting of the Manitoba Chapter, Jack P. Oswald (Left), Winnipeg Brass Ltd., Retiring Chairman, Was Presented With a Desk Set, Complete With Bronze Buffalo and a Name Plate, by the Newly Elected Chapter Chairman, Randy J. Walker, Canadian Liquid Air Co. Ltd. (Below—right) Porter R. Wray (left), U. S. Steel Corp., the recently elected chairman of the Pittsburgh Chapter, is shown accepting the Chapter's gavel from retiring chairman, George H. Enzian, of the Jones and Laughlin Steel Corp.'s Metallurgical Research Division

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(Right) At Worcester Chapter's Election of Officers Are, From Left: Lincoln G. Shaw, Pratt & Inman, 2nd Vice-Chairman; Joseph C. Danec, Norton Behr-Manning Overseas, Inc., Chairman; H. D. Berry, Thomas Smith Co., 1st Vice-Chairman; R. N. S. Merritt, Jr., Olson Mfg. Co., Secretary-Treasurer; and I. J. Donahue, Jr., Executive Committeeman. (Below) Toledo's new officers are, from left: D. K. Siezert, advertising manager; C. H. Cummings, vice-chairman; John E. Preas, chairman; L. R. Albright, secretary-treasurer; C. S. Haughey executive committee

(Below—Left) At the Annual Election of Officers Held by the Milwaukee Chapter of the American Society for Metals, Past Chairman Elmer Gammeter (Left), Globe Steel Tubes Co., Is Shown as he Congratulates the Recently Elected Chairman, Wilson D. Trueblood, Leeds and Northrup Co. (Below—right) Morris Cohen (left), metallurgy department, Massachusetts Institute of Technology, incoming chairman of the Boston Chapter, is shown during the annual election of officers accepting the chairman's gavel from retiring chairman, Sidney H. Baylor, Eastern Appliance Co.

Detroit Metallographic Award Winners

Shown With Their Winning Entries in the First Metallographic Contest Sponsored by the Detroit Chapter of the American Society for Metals Are, From Left: John Wilson, Ford Motor Co., Second Place Award; William Coons, Climax Molybdenum Co., First Place Award; and J. T. Swails, Chrysler Corp., Third Place Award.

The Detroit Chapter held its first metallographic contest with prizes totaling $50 being awarded during the Chapter's Old Timers Night meeting. The response in photomicrographs submitted was very good and the judges expended considerable effort to select the winners of the cash prizes.

The contest was a function of the Educational Committee of the Chapter. First prize of $25 was won by William C. Coons, chief metallographer, Climax Molybdenum Co., whose entry on molybdenum showed very careful sample preparation, excellent technique and good photography. Educational chairman R. D. Chapman, Chrysler Corp., presented the second place check of $15 to John Wilson of the Ford Motor Co. for his excellent picture of camshaft iron. Third place of $10 was awarded to J. T. Swails of the Chrysler Corp., for his entry on toolsteel. Two honorable mention awards were also selected by the judging committee.

The Metallographic Contest is to be an annual affair of the Detroit Chapter's educational program.

This year's winning entries will be entered in the A.S.M. Metallographic Contest to be held during the National Metal Congress and Exposition in Chicago, Nov. 1-5, 1954. (See announcement p. 4.)

Importance of Stress Analysis Considerations In Designing of Parts

Speaker: W. T. Bean, Jr.
Consulting Engineer

The Detroit Chapter heard W. T. Bean, Jr., consulting engineer, present a discussion on "Stress Analysis and the Metallurgist". Mr. Bean first gave an analysis of the common archer's bow, describing the stresses to which a bow is subjected, and illustrating the importance of having a full understanding of a problem before starting a design.

The present trend of designers to make a part both functional and attractive leads, on many occasions, to their overlooking or under-emphasizing the importance of stress analysis. Such practices can result in a necessity to expand complaint departments or in loss of business.

Basic factors designers must consider are materials, load and design. Mr. Bean stressed that in many instances there is a lack of correlation between handbook data and the strength of materials in actual parts. He believes that more knowledge of true stress-strain data must be gained in order to apply materials more intelligently. At present, safety factors are needed to compensate for lack of correlation between test bar and actual part data.

To facilitate manufacture of a part, designers must emphasize the structural requirements at various points and note high stress areas. This information can be obtained by making more extensive use of strain gages, stress coat and extensometers. Another procedure of testing is that of taking fatigue test specimens from various locations of actual parts. These specimens can then be used to evaluate the exact condition of the part, and are most helpful in such metalworking processes as machining, shot peening, etc.

Mr. Bean presented illustrations showing the difference between curves plotted from laboratory data and actual part specimen data. He concluded his talk with a series of slides illustrating the effect of material, load and design in numerous part failures.

—Reported by J. M. Herbenar for Detroit Chapter.

has established Visiting Lectureship for lecturing and holding seminars on engineering subjects pertaining to metals.

Metallurgical News and Developments

Devoted to News in the Metals Field of Special Interest to Students and Others

A Department of *Metals Review*, published by the
American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio

A.E.C. Depository — Stanford Research Institute, Menlo Park, Calif., has been selected by A.E.C. as the West Coast Atomic Energy Industrial Information Depository. Other depositories are the Atomic Industrial Forum, New York, and the John Crerar Library, Chicago.

Cheaper Titanium — Shawinigan Water & Power Co., Canada, has developed an electrolytic process that yields a high-grade titanium for considerably less than the current $5 per lb. price.

New Metal Powder—A metal powder that can electrify any liquid or moist material to yield both alternating and direct current has been developed by Chemalloy Associates, Santee, Calif.

U. S. Mining—Mining industries, particularly those concerned with lead and zinc, are still waiting for more details on the government's stepped-up stockpiling program.

Cable Inspector—To reduce time in inspecting aircraft cable assemblies and wiring systems, Lockheed has developed a testing console that can check a B-29's system in 15 min., a job that used to take 4 hr.

Aluminum-Coated Wire—A process for manufacturing aluminum-coated wire which provides accurate control of thickness and weight has been developed by American Chain & Cable Co., Inc. It is so ductile that it can be drawn down to any thickness.

Research Tool—Analytical research chemists at Mallinckrodt Chemical Works, St. Louis, have developed a quantitative method for determining rare earth residuals as low as 0.005%.

Wind Tunnel—The Air Force has granted a research contract to Illinois Institute of Technology to build a wind tunnel for heat transfer studies just below the speed of sound.

A.E.C. Lab—The National Lead Co. has been selected to operate the A.E.C.'s raw materials development lab at Winchester, Mass.

Uranium Research—A.E.C. is now encouraging such unclassified research on uranium as studies of constitution diagrams and crystal structure, electronics structure, mechanisms of corrosion, etc. Work must be approved by A.E.C.'s office of classification and a license obtained for purchase of natural uranium if more than 3 lb. are to be used.

Bonding Adhesive—A new adhesive which makes it possible to bond metal-to-metal without heat or mechanical pressure develops joints with tensile strengths as high as 2000 psi.

Rolling Mill—Kaiser Co., Oakland, will build a 50-million dollar aluminum rolling mill somewhere in the Ohio River Valley.

Sheet Mill Expansion—Chase Brass & Copper will spend five million dollars to expand and further modernize its sheet mill production facilities in Euclid, Ohio.

Venezuela Steel—Venezuela is making plans to convert its iron deposits into steel. The new steel industry will be geared to 200,000 tons a year.

Speedy Telegraph—A system that can send 600 words per minute has been developed by Teletype Corp., a subsidiary of Western Electric.

Bomb Shelter—Timken Roller Bearing Co. is building a bomb-proof vault for valuable records at its New Philadelphia, Ohio, plant.

Merger—Sheffield Steel Corp. has been consolidated with Armco Steel Corp., which has acquired all property and assets of Sheffield. Business formerly carried on by Sheffield will be operated as Sheffield Steel Division of Armco Steel Corp.

Adopts Foreign Process—Kaiser Engineers Division, Henry J. Kaiser Co., has acquired exclusive rights in the U. S. for the European oxygen steelmaking process.

More Titanium — About 300% more titanium will be used by U. S. aviation industry in 1954 than in 1952.

Reynolds in Philippines — Reynolds Metals Co. will build a plant near Manila capable of filling all foil and construction aluminum needs of the Islands.

Stockpiles—U. S. stockpiles are far below target size for domestically produced tungsten, manganese, chromium, mica, beryl, asbestos and columbium - tantalum and titanium sponge.

Aluminum in Airplanes — Republic Aviation Corp. estimates that 16% of aluminum produced in the U. S. goes into the manufacture of airplanes.

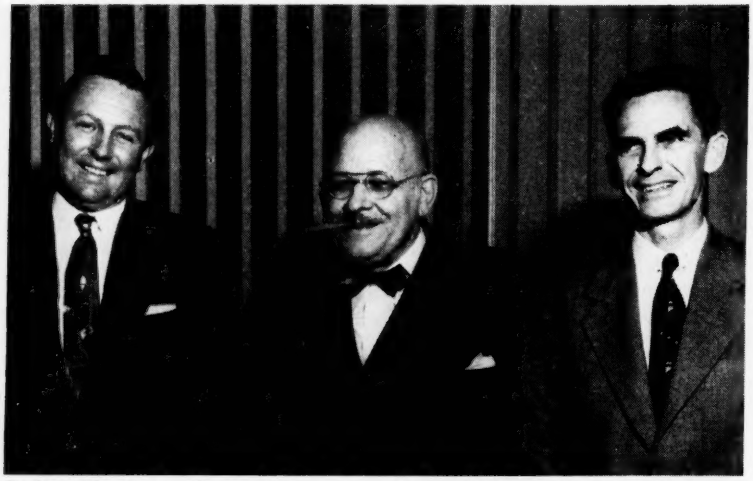
Labrador Ore—The first shipload of Labrador ore left Seven Islands, Quebec, on July 31 for a U. S. East Coast port, the payoff on a $250-million investment and 12 years work.

Shop Forum—The Annual Shop Practice Forum sponsored by Porcelain Enamel Institute will be held Sept. 8-10, 1954, at Urbana, Ill. Host to this year's meeting is the department of ceramic engineering, University of Illinois.

Scholarships—Pfaudler Co. Rochester, has established two scholarships at Ohio State University, one to start in 1954, the other two years later. Scholarship will be awarded to students who have completed their first year in the College of Engineering. Each award consists of $500 per year for four years providing the student maintains a "B" average or better. Details can be obtained from: Department of Metallurgy, 100 Lord Hall, Ohio State University, Columbus 10, Ohio.

TO A.S.M. Members: Many of you are looking forward with pleasure to more details about the Technical Societies Congress in Europe from June 1-19, 1955. If you wish to be immediately informed on additional plans as they develop for the technical program and the planned visits, then send your name to A.S.M. headquarters and request to be placed on the mailing list to receive information about "A.S.M. to Europe in '55".

Cites Stainless Fabricating Factors



E. Von Hambach (Center), Research and Development Engineer, Carpenter Steel Co., Spoke on the "Fabrication of Stainless Steels" at a Meeting in Texas. He is shown with Arthur R. Oakley, Jr. (left), newly elected Chapter chairman, and W. Mack Crook (right), immediate past chairman

Speaker: E. Von Hambach

Carpenter Steel Co.

Speaking on the "Fabrication of Stainless Steels" before the Texas Chapter recently, E. Von Hambach, research and development engineer, Carpenter Steel Co., stressed the fact that the number of types of stainless developed since World War I has increased from 2 to 47, thus allowing the engineer a much broader field of stainless steel metallurgy to explore.

Machining, one of the major problems in fabrication, has been developed by the various combinations of stainless alloys and cutting tools to the point where machining speeds of up to 750 surface ft. per min. are now possible, even with some of the difficult types, such as T-304. The drawing of stainless has in the past posed many problems. The use of nonpinch-passed steel, wherein a final anneal is given after the last drawing pass, tends to restore most of the desired mechanical properties in stainless. Development work has also shown that steel draw rings are not satisfactory in the drawing of stainless; aluminum-bronze and carbide dies are both desirable, carbide probably lasting about 25% longer, although it must be periodically stoned. For stamping and moldings where galling cannot be tolerated, bronze dies are best.

Explosion welding has replaced spot welding in many applications because it leaves no burn marks on the reverse side of the metal. Projection welding has also been used advantageously in the fabrication of stainless.

The source of most major fabrication problems involving stainless steel lies in lack of information on the purchase orders sent to stainless steel mills. Most mills now have advanced techniques to such an extent that they can provide a stainless alloy suited for almost any type of fabrication and can furnish a better stainless steel, if all conditions of fabrication are detailed on the purchase order. **—Reported by Jim Glaze for Texas Chapter.**

Predicts Developments Of Titanium Alloys at Meeting in Los Angeles

Speaker: H. D. Kessler

Titanium Metals Corp. of America

"New Developments in Titanium" was the subject of a talk given before the Los Angeles Chapter by H. D. Kessler, supervisor of the Alloy Development Division of Titanium Metals Corp. of America. Mr. Kessler had also done considerable research work at the Armour Research Foundation on titanium.

H. D. Kessler

Basing his talk on the theme that titanium is no longer an engineering curiosity but has taken a place in the field of design, Mr. Kessler gave a thorough analysis of the alloy possibilities which may be exploited in current and future development.

The various types of commercial and experimental alloys were described with relation to the importance of the proportions of alpha and beta phases in the heat treatment, fabrication, high-temperature stability and general properties of the alloys. Tentative and current alloy nomenclature was discussed in conjunction with the various types of phases present in titanium alloys. Some time will elapse before standardization can be achieved, Mr. Kessler stated.

He discussed briefly the laboratory gamma-phase alloy of 36% aluminum which has high-temperature properties comparable to titanium carbide and stress rupture properties at 1800° F. comparable to molybdenum. The alloy has low ductility but may be useful as a cast or powder metallurgy product.

Mr. Kessler illustrated his talk with data from Armour and the Titanium Metals Corp. The discussion was concluded with the showing of the motion picture. "Planes of the Future".—**Reported by J. A. Chalk for Los Angeles Chapter.**

Sets Price of American Progress at High Rate

Speaker: George W. Gleeson

Oregon State College

George W. Gleeson, dean of the school of engineering, Oregon State College, presented a talk entitled "Progress Has Its Price" at a meeting of the Oregon Chapter. Dean Gleeson brought out the fact that the richness of our country has made Americans better off than persons in any other country. Although we consume 40% of the world's goods, we occupy but 8% of the earth's surface. Our individual lot is getting progressively better. Figures show that, on an average, each person in the United States consumed 79% more goods in 1952 than in 1939, while Europeans improved their lot by 9%, Latin Americans improved their's by 5%, and Asiatics showed no improvement.

It is easily understood that envy turns to animosity towards us as the "have" nation. This factor makes it difficult to meet around international conference tables. Progress has developed so fast that people, in general, are used to living dangerously and have little fear for safety or protection. The future should concern all of us as it tends to be a national feeling to leave our welfare in the hands of the scientists and technologists, and needless to say, we just do not have enough graduates from our colleges and universities in these fields.

Three prize-winning papers were presented after Dean Gleeson's talk by R. W. Knapp, R. F. Stephens and C. R. Utterback, and L. F. Cochran and G. B. Gregg, on the subjects of "Design and Construction of an All-Welded Five-Ton Punch Press", "A Metallographic Study of Welded Ductile Iron", and "The Isothermal Decomposition of Austenite". Prizes were $50, $30 and $20, respectively. **—Reported by J. E. Gustafson for Oregon Chapter.**

At St. Louis Chapter's Officers Night

James B. Austin, National President A.S.M. and W. H. Eisenman, National Secretary, Were Honored at the National Officers and Past Presidents Night Meeting of the St. Louis Chapter. Pictured at the main tables during the dinner are, from left, top: R. D. Bardes, Don McLain, J. S. Skoglund, Art Hunnius, G. A. Fisher, Jr., Dr. Austin, Chairman Martin E. Huether, Mr. Eisenman, Julius Turk, Herb Ball, Frank Delaplane and M. D. Brandwine; and bottom, from left: C. B. Swander, W. E. Buck, F. Guy White, W. J. Ruby, N. M. Waterbury, C. W. Schemm, F. X. Hohn and W. M. Holtgrieve. (Reported by Frank Delaplane for St. Louis)

High-Strength Alloy Steels Subject of Columbus Meeting

Speaker: James C. Butler

United States Steel Corp.

"Recent Developments in Alloy Steels" were discussed at a meeting of the Columbus Chapter by James C. Butler, service metallurgist for the United States Steel Corp.

Mr. Butler described some of the recent work done on steels heat treated to strength levels of 200,000 to 300,000 psi., including high-temperature properties at the lower strength level and some of the processing and design factors which should be considered in these cases.

He pointed out that when people start considering steel with a strength of 300,000 psi. for structural applications, it is with "mixed emotions". The high strengths are desired for their weight-saving advantages, yet there is fear of the low ductility which accompanies high strengths.

The mechanical properties of several alloy steels heat treated to have high strengths were compared in a number of charts. The steels included: Hytuf, 4340, two steels similar to 4340 in alloy content but with 0.25 and 0.28% carbon and containing boron, Super Hytuf, 4360, a 0.51% carbon steel otherwise similar to 4360, and two steels similar to 4340 but containing boron (0.42 and 0.46% carbon). The charts showed that 0.40 to 0.45% carbon gives the best properties for constructional alloy steels heat treated to high strengths of 280,000 to 300,000 psi. When heat treated to an ultimate strength of 290,000 psi., the 4360 and the 0.51 carbon steel had notched-bar impact values of less than 10 ft-lb., while the 0.40 to 0.46 C steels had values of 14 ft-lb. At this strength level, elongations of 9 to 10% and reductions in area of 25 to 30% were found. By comparison, aluminum is used for structural parts with notched bar impact values in the range 2½ or 3 to 8 ft.-lb. Even the 4360 steel has this much ductility with a strength of 290,000 psi. When heat treated to 290,000 psi. ultimate strength, all the compositions have nearly the same fatigue properties, the fatigue strength being 115,000 to 135,000 psi. for the standard bar (unnotched).

The necessity of sufficient machining to remove possible decarburization and surface defects was stressed. At these high strengths, fatigue failures of highly stressed parts are a problem unless all decarburized material is machined away—both on the as-received surface and on machined surfaces subsequently heat treated. It is essential that the surface finish be specified, so that stress raisers may be eliminated.

Hydrogen embrittlement is a serious factor in the high-strength range, and it must be considered. Any part pickled or plated must be baked; this should be done as soon as possible after such operations.

For this high-strength service, only steel melted to the highest quality standards (aircraft) should be considered. Macroetch, Magnaflux and other tests are closely controlled for this high-quality steel.

High-strength 4340 steel has a 1000-hr. creep-rupture strength greater than the 0.2% offset yield strength for temperatures up to 600° F. Thus, design can be based on the yield strength for service up to 600° F. The addition of 0.18% vanadium to the 4340 composition permits use of the yield strength in design for 1000-hr. service at all temperatures up to 700° F.

Some structural components have recently been made of steel heat treated to the 200,000 psi. strength level. Use of this steel gives strength-weight advantages over aluminum alloys, and results in a weight saving.

From the standpoint of ductility, tempering in the range of 550 to 800° F. has been considered unfavorable. However, because of slight embrittlement, 4340 steel, tempered in this tempering range to give strengths of 210,000 to 240,000 psi., is being used. When a steel containing 0.40 to 0.45% carbon is heat treated to a strength of 280,000 to 300,000 psi., tempering is in the range to avoid this embrittlement. The Lockheed Aircraft Co. has reportedly used steel with strengths in the 260,000 to 280,000 psi. range in landing gears. Lockheed engineers consider this definitely a sound aircraft material. So, perhaps, the fear of the embrittlement is premature. Flying time is the test.—**Reported by Ellis Fletcher for Columbus Chapter.**

has established the Foundation for Education and Research in the metals field, with an initial grant of $650,000. This Foundation is the largest ever established in America by a technical society from its own resources.

Jacksonville Visits Steel Foundry

Members of the Jacksonville Chapter Shown Viewing the Steel-Pouring Operation of the 6000-Lb. Hydro-Arc Electric Furnace During Their Tour of the Florida Machine and Foundry Co. at the Last Meeting of the Season

The last meeting of the Jacksonville Chapter for this past season consisted of a plant tour of the Florida Machine and Foundry Co. There were 75 members and guests in attendance.

The group met in the parts room of the plant. Thomas Peacock, who presided over the meeting, presented a short talk on the history and description of the plant's operation. The company, the only steel foundry in the State of Florida, was organized in 1898 by F. G. Russell, Sr. His son, Franklin G. Russell, is now president and general manager of the company.

The company produces electric steel castings ranging from ¼ to 8000 lb. for the rock, paper mill, dredging, land clearing, phosphate, sugar mill and contracting industries. The complete process of making a casting from the initial drawing to the finished product was discussed. Steele Sincox, chief engineer, described the engineering plans of the company. He detailed the role that production development and research play in the development of new land-clearing tools and castings. A committee, made up of the chief engineer, assistan tsuperintendent, and sales engineering staff, does this work on an organized weekly basis. All information and progress are channelled to the committee through the chief engineer.

Bowling Milam, head of sales promotion at Fleco Corp., an associate company of Florida Machine, discussed the use of steel castings in the manufacture of land-clearing equipment and showed a 20-min. flim entitled "Clearing for Production" which illustrated the equipment in operation.

Steve Bowes, sales engineer for Florida Machine, gave a talk on the operation of the new 6000-lb. Whiting hydro-arc electric furnace. He explained the complete operation of the furnace and the details of the melting and refining of a typical heat.

Following the discussions, the group was conducted through the plant where every phase of steelmaking was observed, from pattern making, molding, core blowing, shakeout, cleaning, heat treating, machining, assembling, welding, painting finished products and inspection to shipping.—**Reported by Thomas W. Peacock for Jacksonville Chapter.**

IMPORTANT MEETINGS
for September

Sept. 8-10—American Society of Mechanical Engineers. Fall Meeting, Schroeder Hotel, Milwaukee. (Ernest Hartford, Executive Assistant Secretary, A.S.M.E., 29 West 39th St., New York.)

Sept. 13-24—Instrument Society of America. International Instrument Congress and Exposition, Annual Meeting, Philadelphia. (Richard Rimbach, Secretary, I.S.A., 921 Ridge Ave., Pittsburgh 12, Pa.)

Sept. 21-24—Society for Experimental Stress Analysis. Annual Meeting (in conjunction with International Instrument Congress), Bellevue-Stratford Hotel, Philadelphia. (W. M. Murray, Secretary S.E.S.A., Central Square Station, Cambridge 39, Mass.)

Sept. 20-23—American Mining Congress. Metal Mining Convention and Exposition, Civic Auditorium, San Francisco. (J. D. Conover, Secretary, A.M.C., 1200 18th St., N.W., Washington 6, D. C.)

Sept. 28-Oct. 1—Association of Iron and Steel Engineers. Annual Convention and Iron and Steel Exposition, Public Auditorium, Cleveland. (T. J. Ess, Managing Director, A.I.S.E., Empire Bldg., Pittsburgh 22, Pa.)

Compliments

To the CARBOLOY DEPARTMENT of the General Electric Co., Detroit, for their award of first prize for excellence in industrial exhibiting in 1953. The award was made for the Department's work at the National Metal Congress and Exposition in Cleveland last October.

♦ ♦ ♦

To GEORGE J. FISCHER, member of the New York Chapter's executive committee, on his appointment as director of the metallurgical department of Sam Tour & Co., Inc. A metallurgist at Wetern Electric Co. for two and a half years, Mr. Fischer has also been an instructor at the Polytechnic Institute of Brooklyn since 1948.

♦ ♦ ♦

To AUGUSTUS B. KINZEL on his appointment to director of research for Union Carbide and Carbon Corp. Dr. Kinzel will be responsible for the administration and co-ordination of research activities of all divisions of Union Carbide.

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To DANIEL MAPES, vice-president of Walter Kidde & Co., New Jersey, on being awarded an honorary degree of engineering by Stevens Institute of Technology for his researches and contributions to the field of metallurgy over the past several years.

♦ ♦ ♦

To LOWELL A. WILLEY who has just celebrated his 25th year with the Aluminum Co. of America. He is the sixth member of the Alcoa Research Laboratories metallurgy division to complete 25 years with the company. He began working as a research metallurgist in 1929.

♦ ♦ ♦

To LAWRENCE N. HJELM on being awarded a $400 A.S.M. Scholarship at Illinois Institute of Technology. The scholarship, one of the 48 sponsored by the A.S.M. Foundation for Education and Research, was established to stimulate enrollment of outstanding students in metallurgical courses.

♦ ♦ ♦

To ARTHUR F. LUKOWITZ on his award of a scholarship by Link-Belt Co. for his senior year in metallurgy at Illinois Institute of Technology. The scholarship was established this year to help a worthy student obtain an education in metallurgical, mechanical or industrial engineering, and to further foundry science and technology.

♦ ♦ ♦

To NORMAN L. MOCHEL, manager, metallurgical engineering, Westinghouse Electric Corp., on his election as president of the American Society for Testing Materials for a one-year term, and to RUDOLPH A. SCHATZEL, vice-president and director of engineering, Rome Cable Corp., on his election as vice-president for a term of two years.

Describes Cold Forging Of Aluminum Dies for Los Angeles Members

Speaker: R. A. Quadt
Hunter Douglas Corp.

The Los Angeles Chapter heard R. A. Quadt, director of research and development of the Hunter Douglas Corp., describe "Applications and Metallurgical Problems in Cold Forging Aluminum Alloys" at a recent meeting.

Cold forging is used to manufacture hollow or semihollow geometrically balanced shapes from the structural aluminum alloys 14S, 61S, A51S and 75S. The process is similar to impact extrusion from the standpoint of dies and equipment, but on some shapes there is essentially zero impact with the ram moving relatively slowly.

The majority of the parts currently produced by cold forging are for ordnance applications, where close tolerances at high production rates are the primary requirements. The process is, of course, equally useful for a host of other applications, especially in the aircraft field, with hydraulic plungers for landing gears, poppet valves, condenser cans and "bathtub" fittings being regularly produced.

Advantages of the process are: Close tolerances (diametral tolerances held as low as 0.001 in.); elimination of many machining operations; lack of preferred orientation, with longitudinal and transverse heat treated tensile properties almost identical; and zero draft. Mr. Quadt pointed out that the reduced number of machining operations required after cold forging offers definite savings to the consumer. In one instance the final finished cold forging cost no more than the raw material stock for its fully machined counterpart.

In a series of slides, Mr. Quadt illustrated the sequence of operations for production of proximity fuse bodies, "wind-shield" forgings for 120-mm. shells, burster casings for 90 mm. smoke and gas shells, several sizes of rocket tubes and a 5-in. rocket cap. For some of these ordnance parts the forgings are used in the as-forged condition, even though the aluminum alloys used are heat treatable types. This eliminates the quench-warpage problem while retaining adequate strength.

During the question period following the meeting it was brought out that cold forging work hardens the materials to approximately temper —H14 to —H19, and that the maximum temperature developed in the material during the forging operation does not exceed 300° F. The above work hardened tempers are sometimes modified with conventional stress-relief heat treatments.—**Reported by J. A. Chalk for Los Angeles Chapter.**

OBITUARIES

WILLIAM PLATT WOOD, professor in the department of metallurgical engineering, University of Michigan, suffered a heart attack and died in his office on the campus on July 12.

HARRY A. SCHWARTZ, lecturer on special subjects at Case Institute of Technology and for many years metallurgist and assistant superintendent at National Malleable & Steel Castings Co., died on July 25 at the age of 74. Dr. Schwartz was a graduate of Rose Polytechnic Institute. He was an outstanding authority in the foundry industry.

X-Ray Diffraction School

General Electric Co. is conducting its fall diffraction school in Milwaukee from Sept. 27 through Oct. 1, 1954. Instruction will be divided into three groups: Basic principles of X-ray diffraction and their use; application to various fields of science and industry; and work with various diffraction and fluorescence instruments in laboratory sessions.

Applications will be accepted before Sept. 15 at the General Electric Co., X-Ray Department, 4855 Electric Ave., Milwaukee 1, Wis.

Presteel Award

The Worcester Pressed Steel Co. has established an annual Presteel Award as a recognition of an individual or company selected as having made significant contributions to the advancement of the metal stamping industry. The award is being sponsored in association with the Pressed Metal Institute as part of its 50th Anniversary celebration.

New Films

Shell Molding and You

A 25-min. sound slidefilm designed to acquaint foundrymen and buyers of foundry products with the latest benefits of this new casting process has been produced by General Electric Co.'s Chemical Materials Department. It describes the advantages of shell molding over other casting methods, affording a step-by-step demonstration of shell molding operations at G.E.'s new experimental foundry in Pittsfield, Mass.

The film may be borrowed by writing: General Electric Co., Chemical Materials Dept., Pittsfield, Mass.

Centrifugally Spun Tubes

A 16-mm. sound motion picture in color, produced by the American Cast Iron Pipe Co., completely illustrates the production of centrifugally spun tubes. The film is available without charge to interested groups and may be obtained by writing to American Cast Iron Pipe Co., P. O. Box 2603, Birmingham 3, Ala.

Holds First Annual Outing

The newly organized Northeast Pennsylvania Chapter held its first annual June Outing late in the month. While the members played golf, their wives enjoyed swimming or bridge games. A social hour, sponsored by Sylvania Electric Products Inc., was held after the guests had enjoyed their dinner, and dancing completed the evening.

Mark Opening of New Plant

Officials of Vanadium-Alloys Steel, Canada, Ltd., Marked the Opening of the Firm's London, Ont., Plant With an Informal Party and Conducted Tours of the Plant for More Than 200 American and Canadian Industrial Leaders. At the reception were, from left: H. G. Johnstin, metallurgical engineer; G. A. Roberts, vice-president in charge of technology and A.S.M. president elect; H. A. Stewart, board member; and R. B. George, vice-president of sales, all of Vanadium-Alloys Steel Co., Latrobe, Pa.

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio

Stewart J. Stockett, Technical Abstracter

Assisted by Fred Body, Mitchell Baker, Mildred Landon and Members of the Translation Group

A
General Metallurgical

181-A. Safe Handling of Metal Hydrides. M. D. Banus. *Chemical and Engineering News,* v. 32, June 14, 1954, p. 2424-2427.

Hydrides can be handled safely if adequate precautions, combined with careful engineering and process development, are employed. Table, photographs, diagram. (A7)

182-A. Joint Operation of Multiunit Complexes for Minimum Cost. Karl M. Mayer. *Industrial and Engineering Chemistry,* v. 46, June 1954, p. 1247-1255.

Aids individual production supervisors, once assigned production quotas, to determine if they are obtaining desired output from processes, pot lines, mills or plants at minimum cost to their companies. Graphs, diagrams. 2 ref. (A4)

183-A. The Nature of Education in Metallurgical Engineering. Robert F. Mehl. *Journal of Metals,* v. 6, June 1954, p. 728-733.

Aims of education, need for stressing basic principles, development of skills and industry and university relationships. Photographs. (A3)

184-A. A Description of Aluminium Laboratories Ltd. at Banbury. *Sheet Metal Industries,* v. 31, no. 326, June 1954, p. 447-462.

Equipment and role of research center in field of fabrication and utilization. Diagram, photographs. (A9, Al)

185-A. (German.) **Recent Development in the Field of the Sorting of Shavings.** Edmund R. Thews. *Metallurgie und Giesserei Technik,* v. 4, no. 4, Apr. 1954, p. 182-184.

Methods for separating metal shavings for further processing. Diagrams. (A8, Cu, Sn, Pb)

186-A. (Polish.) **Possibilities of Refining Unclassified Scrap of Non-Ferrous Alloys by Means of Solid Paraffin Chlorides.** Stanislaw Woloszyn. *Hutnik,* v. 21, no. 3, Mar. 1954, p. 72-74.

Principles, advantages and possibilities of various methods. Tables, graph. 10 ref. (A8, Al, Cu, Mg, Sn, Pb, Zn)

187-A. (Swedish.) **Rationalization and Man-Power Problems in the Iron and Steel Industry From a Physiological Point of View.** E. Hohwü Christensen and Folke Nilsson. *Jernkontorets Annaler,* v. 138, no. 5, 1954, p. 288-309.

Determination of working capacity of individual workers. Evaluation of physiological stress of different jobs. Tables, charts, photographs. (A6, D general)

188-A. Development in the Iron and Steel Industry in Great Britain. T. P. Colclough. *Engineer,* v. 197, June 11, 1954, p. 856-857.

Excerpts from lecture delivered at Royal Institution, London. Re-equipment and reorganization during the thirties. War experience between 1939 and 1945; reconstruction of the industry since the end of the war; and future prospects. (A4, A6, Fe, ST)

189-A. Salute to New England. *Iron Age,* v. 173, June 24, 1954, p. 123 + 42 pages.

Survey of facilities for metalworking, research and machine tool production. Labor and financial resources. Industrial opportunities. Tables, graphs, photographs. (A general)

190-A. The Role of Aircraft Research in Furnace Design. J. H. Chesters. *Iron & Steel,* v. 27, June 1954, p. 207-212.

Similarity between aerodynamic and furnace problems. Photographs, diagrams, micrographs. 6 ref. (To be concluded.) (A9)

191-A. Intra-Plant Handling of Round Billets and Pipe With Special Automotive Equipment. J. D. Tyson. *Iron and Steel Engineer,* v. 31, June 1954, p. 107-114; disc., p. 114-116.

Rubber-tired equipment gives improved efficiency and performance. Diagrams, photographs. (A5)

192-A. Aluminum vs. Steel. I. *Modern Metals,* v. 10, June 1954, p. 34-38, 40.

Defines area of competition between the metals and attempts a comparison between the two industries in terms of production costs and prices. Tables. (A4, Al, ST)

193-A. Progress in Steelmaking. *Steel,* v. 135, July 5, 1954, p. 72, 74, 76.

British steel industry unifies research. Photographs. (A9)

194-A. Maintenance-Organization. C. A. Gallaher. *Western Metals,* v. 12, June 1954, p. 48-51.

Exacting maintenance techniques required by today's high precision metalworking plant. Photographs, diagram. (A5, G general)

195-A. Guide for Steel Buyers. *Steel,* v. 135, July 12, 1954, sec. 2, 112 p.

Listing of manufacturers and products. Includes indexes. (A10, ST)

196-A. (Book.) **Metal Progress Data Sheets.** 192 p. 1954. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $6.00.

Selection of useful data published in monthly issues since 1930. (A general)

197-A. (Book.) **Nonferrous Metals—World Production and Consumption.** 258 p. 1953. Statistics compiled by Metallgesellschaft A. G., Reuterweg 14, Frankfurt-on-Main.

Surveys industrial production and raw materials requirements during the last 25 years. (A4, EG-a)

198-A. (Book.) **The Wire Industry Encyclopaedic Handbook, 1954.** 492 p. 1954. The Wire Industry Ltd., 33 Furnival St., London.

Trade summary for 1953, branded names for wire, wire machinery, etc. American wire specifications and English and foreign wire terminology. (A10, F28, S22)

199-A. (Book—German.) **(Alloy Handbook of Nonferrous Metals.) Legierungs-Handbuch der Nichteisenmetalle.** Ernst Brunhuber. 196 p. 1954. Fachverlag Schiele und Schön, Berlin. DM21.

Covers 1359 nonferrous alloys. Grouped under alloys containing aluminum, copper, magnesium, and lead; other heavy-metal alloys; and precious-metal alloys. (A10, EG-a)

The coding symbols at the end of the abstracts refer to the ASM-SLA Metallurgical Literature Classification. For details write to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

B
Raw Materials and Ore Preparation

201-B. The Application of Fatty Chemicals to Flotation. Robert E. Baarson and John R. Parks. *American Oil Chemists' Society, Journal,* v. 31, June 1954, p. 261-266.

Use of fatty acids and their derivatives for separating mineral particles from each other in a liquid pulp by means of air bubbles. Tables. 9 ref. (B14)

202-B. Some Aspects of Sintering Operations and Sinter Usage. The Use of Sinter at Algoma Steel Corporation. Douglas Joyce. *Blast Furnace and Steel Plant,* v. 42, June 1954, p. 657-665.

Advantages, operation and production. Tables, graphs, photographs, diagrams. (B16, D general, Fe)

203-B. Iron From Jasper: Off To a Running Start. *Business Week,* 1954, no. 1294, June 19, p. 94 + 6 pages.

Operation and potentials of commercial beneficiation plant. (B14, Fe)

204-B. Ore Dressing Developments in Australia During 1953. II. H. H. Dunkin. *Chemical Engineering and Mining Review,* v. 46, no. 7, Apr. 1954, p. 271-275.

Treatment of gold, tungsten, uranium and other ores. 46 ref. (B14, Au, W, U)

205-B. Nicaro Proves Lateritic Nickel Can Be Produced Commercially. George P. Lutjen. *Engineering and Mining Journal,* v. 155, June 1954, p. 81-89.

Technical achievements in extraction of nickel. Photographs, maps, diagrams. (B general, Ni)

206-B. Current Trends in the Development and Uses of Refractories. H. K. Mitra. *Indian Institute of Metals, Transactions,* v. 6, 1952, p. 327-338.

Theoretical study and practical applications. Diagrams, table, photograph. 4 ref. (B19)

207-B. Sinter Is What You Make It. E. H. Rose and D. J. Reed. *Journal of Metals,* v. 6, June 1954, p. 740-744.

Control instruments for iron ore sinter plant, including permeability meter, draft gages and flowmeters. Photograph, graphs, table. (B16, S18, Fe)

208-B. Activities of Fe, FeO, Fe_2O_3, and CaO in Simple Slags. Hugo R. Larson and John Chipman. *Journal of Metals,* v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, June 1954, p. 759-762.

Calculations using a modification of the ternary Gibbs-Duhem equation. Graphs, diagrams. 5 ref. (B21, P12, Fe)

209-B. Selectivity of Flotation Frothers. S. A. Wrobel. *Mine & Quarry Engineering,* v. 20, June 1954, p. 267-270.

Electrophysical aspects of separation by froth flotation. Table, diagrams. 20 ref. (B14)

210-B. The Liquid-Solid Cyclone as a Classifier in the Closed-Circuit Grinding of Concentrates. F. M. Lewis and E. C. Johnson. *Mining Engineering,* v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 199, June 1954, p. 620-621.

Costs involved and operating experience. Photographs, diagram, tables. (B13)

211-B. Properties of Nonmagnetic Taconites Affecting Concentration. Donald W. Scott and Adam L. Wesner. *Mining Engineering,* v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 199, June 1954, p. 635-641.

Study of 23 nonmagnetic iron-formation samples shows significance of chemical, mineral and physical properties in terms of their concentration. Tables, micrographs, diagram. 5 ref. (B14)

212-B. On the Mineralogy of the Black Mineral Anosovite in High-Titanium Slags. D. S. Belyankin and V. V. Lapin. *Henry Brutcher, Altadena, Calif., Translation no.* 3098, 7 p. (From *Doklady Akademii Nauk SSSR,* v. 80, no. 3, 1951, p. 421-424.)

Isolation of anosovite from two titanium-containing slags. Mineralogical data and chemical analyses. Tables, micrographs. 3 ref. (B21, Ti)

213-B. (Russian.) **Utilization of Cupola Thermoanthracite for Cast Iron Melting.** E. E. Erenburg. *Liteinoe Proizvodstvo,* 1954, no. 2, Mar.-Apr., p. 24-26.

Treatment of anthracite to make satisfactory cupola fuel. (B18, E10, CI)

214-B. The Quemont Milling Operation. C. G. McLachlan, M. J. S. Bennett and R. L. Coleman. *Canadian Mining and Metallurgical Bulletin,* v. 47, no. 506, June 1954, p. 386-401; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 57, 1954, p. 230-245.

Milling and concentration of copper and zinc ores. Flowsheet, photographs, tables, diagrams. 6 ref. (B13, B14, Cu, Zn)

215-B. The Operations and Plants of the Consolidated Mining and Smelting Company of Canada Limited. *Canadian Mining Journal,* v. 75, May 1954, p. 127-393.

History, organization, mining, dressing and smelting of copper, lead and zinc ores, production of byproduct chemicals and fertilizers. Photographs, graphs, diagrams, tables. (B general, C general, Cu, Pb, Zn)

216-B. Raw Materials for the Japanese Iron and Steel Industry. II. R. C. Whitehead. *Chemical Engineering and Mining Review,* v. 46, no. 7, Apr. 1954, p. 267-270.

Iron ore resources of Asia, survey of deposits, estimates of ore reserves and average grade. Tables. (To be continued.) (B10, Fe)

217-B. The Chemical Engineer in the Steel Industry. Thomas F. Reed. *Chemical Engineering Progress,* v. 50, June 1954, p. 288-290.

Chemical problems in raw materials, blast furnace practice, steel refining, coking and abatement of pollution. (B general, D general, ST)

218-B. Use of Oxygen in Steel Mills. Glenn O. Carter. *Iron and Steel Engineer,* v. 31, June 1954, p. 80-86; disc., p. 86.

Present usage in Europe and U.S. Future possibilities. Diagrams, graphs, photographs. (B22, D general, ST)

219-B. A Method of Automatic Control for Sinter-Plant Feeder Tables. S. K. Dean, W. N. Jenkins, P. K. Gledhill and A. J. Blanchard. *Iron and Steel Institute, Journal,* v. 177, June 1954, p. 220-223.

Rate of flow of material from a sinter-plant rotary feeder table controlled by using Simon constant-weight feeder (a weighing conveyer) to control table speed. Photograph, diagrams, graphs. 2 ref. (B16)

220-B. Iron Ore the Hard Way. *Westinghouse Engineer,* v. 14, July 1954, p. 130-134.

Review of winning and beneficiating procedures for taconite. Costs of operations. Photographs, diagrams, chart. (B14, Fe)

221-B. Acid Pressure Leaching of Uranium Ores. F. A. Forward and J. Halpern. Paper presented at Pacific Northwest Metals and Minerals Conference of the A.I.M.E., 1954, Portland, Ore. 11 p.

Includes graphs. 5 ref. (B14, U)

222-B. The Bunker Hill-Bailey Meter Density Recorder and Controller. Alvin F. Kroll. Paper presented at Pacific Northwest Metals and Minerals Conference of the A.I.M.E., Portland, Ore. 7 p. + 5 plates.

Includes table, charts, diagram, photograph. (B14, P10)

223-B. (English.) **Molecular Interactions at the Solid-Liquid Interface With Special Reference to Flotation and Solid Particle Stabilized Emulsions.** J. H. Schulman and J. Leja. *Kolloid-Zeitschrift,* v. 136, nos. 2-3, May 1954, p. 107-119; disc., p. 119-120.

Experiments with various surface active agents employed in flotation of ores as either collectors or floaters. Tables, graphs, diagrams. 32 ref. (B14)

224-B. (German.) **Chlorination and Selective Combustion of Materials Containing Heavy Metals.** W. Kangro, F. Weingärtner and Anneliese Kolbus. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 7, no. 5, May 1954, p. 202-204.

Method for separation of iron from iron-rich minerals by means of chlorination. Oxidation of chlorination products. Experimental details. Tables. (B14, Fe)

225-B. (Polish.) **Self-Fluxing Sinters of Iron Ore.** B. Sewerynski. *Prace Instytutow Ministerstwa Hutnictwa,* v. 6, no. 2, 1954, p. 83-89.

Analysis of various mixtures shows that additions of burned lime produced best results. Strength properties depend on quality of slag-generating constituents. Diagrams, tables, charts. 11 ref. (B16, Q23, Fe)

226-B. (Czech.) **Reverse Leaching of Zinc Concentrates.** Ferdinand Kadlec. *Hutnické Listy,* v. 9, no. 5, 1954, p. 274-276.

Process uses different solubility of ZnO and silicates with slight change of H_2SO_4 concentration. Tables. (B14, Zn)

227-B. (Russian.) **Investigation of Properties of Fused Slag Components by Method of Electromotive Forces.** O. A. Esin and B. M. Lepinskikh. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 2, Feb., p. 60-66.

Technique for determining activities of CaO, MgO, Al_2O_3 and SiO_2. Possibility of using method to control composition of metallurgical slags. Tables, diagrams. 3 ref. (B21, P12)

228-B. (Russian.) **The Physics of the Crushing Process and the Mechanics of Jaw Crushers.** L. B. Lebenson. *Mekhanizatsiia Stroitelbstva,* v. 11, no. 1, Jan. 1954, p. 27-31.

Critical review of previous theories and recent hypothesis of T. I. Mukha. Diagrams. (B13)

C

Nonferrous Extraction and Refining

137-C. Some Factors Influencing the Production of Manganese From Open-Hearth Slags. I. The Establishment of Correct Operating Conditions in the Electric Furnace and the Chemistry of the Two-Stage Process. J. A. Gregory. *Australasian Engineer,* 1954, Apr., p. 47-53.

Difficulties encountered during full-scale operation and methods of control. Graphs. 14 ref. (C21, D2, Mn)

138-C. Uranium Tons. Grams of Plutonium. *Chemical and Engineering News,* v. 32, June 7, 1954, p. 2288, 2290, 2292.

Solvent extraction process used to make primary separation of plutonium from uranium. Photograph, diagram. (C28, U, Pu)

139-C. Thorium and Rare Earths From Monazite. A. E. Bearse, G. D. Calkins, J. W. Clegg and R. B. Filbert, Jr. *Chemical Engineering Progress,* v. 50, May 1954, p. 235-239.

Processing sodium hydroxide offers advantages over conventional sulfuric acid process now used by rare earths industry in U. S. Tables, photographs, diagram. 4 ref. (C28, EG-g, Th)

140-C. Plutonium Factory at Sellafield, Cumberland. *Engineer,* v. 197, May 21, 1954, p. 742-744.

Irradiation of uranium and subsequent chemical treatment of the products to separate plutonium, uranium, solvents, and unwanted

fisson products. Photographs. (C28, U, Pu)

141-C. A Note on Certain Disproportionation Reactions of the Halides of Titanium. S. Ramamurthy. *Indian Institute of Metals, Transactions,* v. 6, 1952, p. 274-278.

Stability of decomposition of tetrahalides examined by evaluating free energy changes at different temperatures. Tables. 3 ref. (C4, Ti)

142-C. Some Developments in the Electrolytic Production of Aluminium. R. Thyagarajan, R. S. Ramachandran and K. K. Cherian. *Indian Institute of Metals, Transactions,* v. 6, 1952, p. 296-318 + 1 plate; disc., p. 318-319.

History and growth of industry. Developments in cell design and operation and anode manufacture. Mechanism of reaction between various constituents of bath in electrolytic cell. Tables, graphs. 25 ref. (C23, Al)

143-C. Amalgam Metallurgy: Present Trends and Future Possibilities. J. Balachandra. *Indian Institute of Metals, Transactions,* v. 6, 1952, p. 320-325; disc., p. 326.

Present applications of amalgams and some future possibilities in extraction of metals. Tables. 5 ref. (C29, Hg)

144-C. Titanium Metal Production Expanded at Henderson Plant. P. J. Maddex. *Journal of Metals,* v. 6, June 1954, p. 734-736.

Plant equipment and operations. Chlorination and arc-melting furnaces. Photographs, diagram, flow sheet. 2 ref. (C2, C21, Ti)

145-C. Reverberatory Furnace Practice at Noranda. J. N. Anderson. *Journal of Metals,* v. 6, June, 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, June 1954, p. 745-758.

Smelter developments over 25-yr. period including increasing furnace tonnage from 700 to 2000 tons per furnace day, the use of the suspended basic roof and improvements in furnace fuel ratio. Diagrams, tables. 5 ref. (C21, Cu, Au)

146-C. Purification of Antimony and Tin by a New Method of Zone Refining. M. Tanenbaum, A. J. Goss and W. G. Pfann. *Journal of Metals,* v. 6, June 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, June 1954, p. 762-763.

A reciprocating method of passing molten zones through a straight ingot which effects a considerable economy of time and apparatus. Tables, diagrams. (C5, Sb, Sn)

147-C. New Technique for Preparing Homogeneous Alloys. Pascal Levesque. *Journal of Metals,* v. 6, June 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, June 1954, p. 772-773.

Utilization of zone melting principles to provide faster alloy homogenization by permitting the melt to freeze at constant temperaure and by favoring the freezing of a solid phase invariant in chemical composition. Diagram, graphs. (C15)

148-C. Zirconium Production by Fused Salt Electrolysis. *Metal Industry,* v. 84, May 28, 1954, p. 468.

Mechanism of process and its results. 2 ref. (C23, Zr)

149-C. (French.) **Aluminum and Electricity.** *Journal du Four Electrique,* v. 63, no. 2, Mar.-Apr. 1954, p. 37-39.

Electricity requirements for aluminum production. (C23, Al)

150-C. (French.) **Single or Three Phase Furnace?** M. Kaufmann. *Journal du Four Electrique,* v. 63, no. 2, Mar.-Apr. 1954, p. 41-42.

Compares two types. The three-phase furnace is more efficient at power settings of 3000-5000 kw. (C21)

151-C. (Hungarian.) **Research Into the Current Efficiency During Aluminum Electrolysis.** Gyula Szekér. *Kohaszati Lapok,* v. 9, no. 5, May 10, 1954, p. 222-232.

Aluminum losses as a function of composition of the electrolyte and temperature; current efficiency as a function of composition of the electrolyte, distance between the poles, current density and temperature; and connection between current efficiency and composition of the anode gases. Tables, charts, diagrams, photograph. 25 ref. (C23, Al)

152-C. Titanium Melting Progress. *Light Metal Age,* v. 12, June 1954, p. 15, 33, 36.

Arc-melting in water-cooled copper crucible and skull melting. Remelting furnaces. Photograph. (C21, Ti)

153-C. Refining Beryllium. *Metal Industry,* v. 84, June 18, 1954, p. 529.

Application of arc smelting with temperatures reaching 15,000 to 20,000° F. (C21, Be)

154-C. A Laboratory Arc-Melting Furnace. Morris L. Nielsen and I. B. Johns. *Review of Scientific Instruments,* v. 25, June 1954, p. 596-598.

Using a glass resin kettle as enclosure, and an inverted-*J* electrode, a small arc-melting furnace was designed for melting metals under an inert atmosphere. Photograph, diagrams, tables. 7 ref. (C21, Ti)

155-C. Pure Metals. Lawrence P. Lessing. *Scientific American,* v. 191, July 1954, p. 36-40.

Vacuum and zone melting, electromagnetic suspension and iodide process for producing zirconium. Properties of pure metals. Micrograph, photographs, diagram. (C5, C23, C25, C4, Q general, Zr)

156-C. A Survey of the Literature on the Extractive Metallurgy and Electrolytic Refining of Bismuth. P. M. Gruzensky and W. J. Crawford. *U. S. Bureau of Mines, Information Circular* 7681, May 1954, 12 p.

Use of aqueous, nonaqueous and fused electrolytes in electrolytic refining. 52 ref. (C23, Bi)

157-C. Refining Indium by Amalgam Metallurgy. F. A. Hames. Paper presented at Pacific Northwest Metals and Minerals Conference of the A.I.M.E., 1954, Portland, Ore. 4 p.

Includes graph. 3 ref. (C29, In)

158-C. (French.) **New Ferromagnetic Bodies in the Rare Earth Group. The Gadolinium-Magnesium Alloys.** F. Gaume-Mahn. *Bulletin de la société chimique de France,* 1954, no. 5, May, p. 569-575.

Alloys obtained by reaction of magnesium on gadolinium fluoride with distillation of excess magnesium. Magnetic properties. Graphs, diagrams, table. 23 ref. (C22, P16, Gd, Mg)

159-C. (German.) **Thermal Production of Aluminum.** Paul Weiss. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 7, no. 5, May 1954, p. 189-195; disc., p. 195.

Theoretical basis for carbon reduction of aluminum. Suppression of carbide formation and production and refining of preliminary alloy. Diagrams, graph. 15 ref. (C21, Al)

160-C. (German.) **State of Development of Multicomponent Magnesium-Zirconium and Magnesium-Thorium-Zirconium Alloys.** Franz Sauerwald. *Zeitschrift für Metallkunde,* v. 45, no. 5, May 1954, p. 257-269.

Literature review. Tables, graphs, micrographs. 149 ref. (C general, Mg, Zr, Th)

161-C. Electrodeposition of Bismuth. Kelso B. Morris, Dolores Z. Douglass and Clarence B. Vaughn. *Electrochemical Society, Journal,* v. 101, July 1954, p. 343-347.

Bismuth metal of high purity was electrodeposited from molten mixtures of bismuth trioxide (10% and 25%) and the eutectic mixture of sodium and calcium chlorides. Table. 15 ref. (C23, Bi)

162-C. Recovery of Copper From Scrap. D. S. Tandon and T. Banerjee. *Indian Institute of Metals, Transactions,* v. 5, 1951, p. 323-349.

Recovery and refining of scrap copper by smelting and by electrolytic processes. Table, flowsheets, diagrams. 37 ref. (C21, C23, A8, Cu)

163-C. Titanium Extraction by Chloride Process Presents a Variety of Problems. W. R. Opie. *Journal of Metals,* v. 6, July 1954, p. 807-810.

Chlorination of rutile, ilmenite and titaniferous magnetite. Production of titanium concentrates by smelting. Photograph, tables, micrographs, flowsheet. (C4, C21, Ti)

164-C. Direct Current Requirements at Carteret Copper Refinery Supplied by Three Units. Edwin M. Meyer. *Journal of Metals,* v. 6, July 1954, p. 811-813.

Rectifiers and other power supply equipment. Photographs. (C21, Cu)

165-C. Desilverizing of Lead Bullion. T. R. A. Davey. *Journal of Metals,* v. 6, July 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, July 1954, p. 838-848.

Reviews published literature on Ag-Pb-Zn system: Practical desilvering processes using zinc. Graphs, phase diagrams, flowsheets. 35 ref. (C26, Zn, Ag, Pb)

166-C. Progress Report on Titanium. *Steel,* v. 135, July 12, 1954, p. 126.

Developments in production of titanium by electrolysis and by reacting titanium carbide with zinc or magnesium oxide. Photograph. (C23, C26, Ti)

167-C. (Czech.) **Theory of Melting in Lead Blast Furnace.** A. Mayer. *Hutnické Listy,* v. 9, no. 5, 1954, p. 276-279.

Experiments with coke combustion; combustion period formulas derived and applied. Table, graphs, diagram. (C21, Pb)

168-C. (Czech.) **Preparation of Titanium Tetrachloride and Its Reduction Into Titanium Metal.** Jiri Rakosnik. *Hutnické Listy,* v. 9, no. 5, 1954, p. 268-272.

Preparation, refining and reduction with magnesium. Diagrams. 11 ref. (C4, C26, Ti)

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Ferrous Reduction and Refining

281-D. Some Statistical Methods Used in Studies of Steel Plant Operations. A. P. Woods. *Blast Furnace and Steel Plant,* v. 42, June 1954, p. 649-652, 665.

Application to management problems regarding use of available plant equipment and investment for plant improvement and expansion. Graphs. 3 ref. (D general, A5, S12, ST)

282-D. Significance of Minor Elements in Iron-Bearing Raw Materials for Integrated Steel Plants. C. B. Jacobs, J. F. Elliott and M. Tenenbaum. *Blast Furnace and Steel Plant*, v. 42, June 1954, p. 666-674, 679, 688.

Origin, elimination and effect on finished product. Tables, graphs. 10 ref. (D general, B general, Fe)

283-D. Continuous, Automatic Iron Casting. *Canadian Metals*, v. 17, May 20, 1954, p. 24, 26.

Saves labor, raw materials, loss from rejects and overhead of quality control. Photographs. (D9, CI)

284-D. Mixer Operation and Its Relation to Slopping in the Acid Bessemer Converter and to the Opening Bath Sulphur in the Duplex Process. H. Schrader and S. Visvanathan. *Indian Institute of Metals, Transactions*, v. 6, 1952, p. 22-52; disc., p. 52-53.

Behavior of slags employed in a hot metal mixer for low-manganese duplex iron. Tables, diagrams, graphs. 23 ref. (D3, D7, Fe)

285-D. Mill Gives Dornin Process First Big Test. G. A. Dornin, Jr., R. H. Spence and W. H. Meyer. *Iron Age*, v. 173, June 17, 1954, p. 141-144.

Sound ingots produced without hot tops. Yield per ingot is about 12% higher. Diagrams, photographs. (D9, ST)

286-D. Kinetics of Low-Temperature Reduction of Iron Ores. Reduction of Chemically Pure Ferric Oxide With Hydrogen. S. T. Rostovtsev and A. P. Em. *Henry Brutcher, Altadena, Calif., Translation* no. 3217, 7 p. (From *Doklady Akademii Nauk SSSR*, v. 93, no. 1, 1953, p. 131-134.)

Reduction kinetics at temperatures of 525-750° F. Graphs, table. 3 ref. (D1, Fe)

287-D. Kinetics of Low-Temperature Reduction of Iron Ores. Reduction of Synthetic and Natural Iron Ores With Hydrogen. S. T. Rostovtsev and A. P. Em. *Henry Brutcher, Altadena, Calif., Translation* no. 3218, 7 p. (From *Doklady Akademii Nauk SSSR*, v. 93, no. 2, 1953, p. 329-332.)

Previously abstracted from original. See item 60-D, 1954. (D1, Fe)

288-D. Behavior of Hydrogen in Steel Making. E. Piper, H. Hagedorn and H. Backes. *Henry Brutcher, Altadena, Calif., Translation no.* 3235, 27 p. (From *Stahl und Eisen*, v. 73, no. 13, 1953, p. 817-825.)

Previously abstracted from original. See item 277-D, 1953. (D general, S11, ST)

289-D. Refining of Steel With Pure Oxygen by the Top Blowing (LD) Process. H. Trenkler. *Henry Brutcher, Altadena, Calif., Translation no.* 3238, 28 p. (Slightly condensed from *Revue Universelle des Mines*, v. 96, ser. 9, no. 8, Aug. 1953, p. 644-657.)

Production of steel with very low phosphorus, sulfur, nitrogen and oxygen contents by blowing 98% pure oxygen onto surface of bath. Tables, graphs, diagrams, sulfur prints. 17 ref. (D3, CN)

290-D. (French.) **New Charging Apparatus for Blast Furnaces.** Daniel Petit. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 11, no. 5, 1954, p. 917-925.

Application of rotating top-bell. Diagrams. (D1)

291-D. (French.) **Duffield Process for the Production of Pig Iron.** G. Zuliani. *Journal du Four Electrique*, v. 63, no. 2, Mar.-Apr. 1954, p. 45-46.

Direct reduction of ore in electric furnaces. Tables. (D5, CI)

292-D. (French.) **Observations on the Working of Blast Furnaces on Sinter and Lorraine Ore.** J. Szczeniowski and P. Thierry. *Revue de métallurgie*, v. 51, no. 5, May 1954, p. 305-324; disc., p. 324-325.

Poorer permeability, high flame requirement and cooling difficulties. Effects of burden enrichment. Graphs, tables, diagrams. (D1, CI)

293-D. (German.) **The Smelting of Iron Ore in the Rotary Furnace.** Wilhelm Böddeker. *Metallurgie und Giesserei Technik*, v. 4 no. 4, Apr. 1954, p. 148-157.

Smelting of low-grade ore with low-grade coal in Sturzelberg. Experimental plant, details of experiments and operation of the rotary furnace. Diagrams, tables, charts. 14 ref. (D8, Fe)

294-D. (Hungarian.) **The Production of Steels Free of Cavitation and Liquation.** Ernö Weigl. *Kohaszati Lapok*, v. 9, no. 5, May 10, 1954, p. 207-216.

Causes of cavitation. Details of continuous casting process and its effects on quality of the steel and possible savings in material. Tables, charts, diagrams. (D9, ST)

295-D. (Swedish.) **A Process for Reduction of Iron Ore in a Rotary Furnace Without Melting.** Bo Kalling and Folke Johansson. *Jernkontorets Annaler*, v. 138, no. 5, 1954, p. 253-270.

Desulfurization of sponge iron. Possibilities for steelmaking. Tables, diagrams, photographs. 6 ref. (D8, Fe)

296-D. The Oxygen Steel Making Process. F. J. McMulkin. *Canadian Mining and Metallurgical Bulletin*, v. 47, no. 506, June 1954, p. 381-385; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 57, 1954, p. 225-229.

Principles, reactions, removal of phosphorus and sulfur, yield and quality of end product. Diagram, graph, tables. 4 ref. (D8, ST)

297-D. Regenerator Efficiency and Air Preheat in the Open Hearth. VI. B. M. Larsen. *Industrial Heating*, v. 21, June 1954, p. 1142, 1146, 1148, 1150.

Satisfactory method of openhearth control. (To be continued.) (D2)

298-D. Electric Steel Production. I. Sulphur and Hydrogen Removal. D. D. Howat. *Iron & Steel*, v. 27, June 1954, p. 223-227.

Expansion and advantages. Methods of eliminating impurities. 48 ref. (To be continued.) (D5, ST)

299-D. The Role of Aircraft Research in Furnace Design. II. The Application of Aerodynamics to O-H. Development. J. H. Chesters. *Iron & Steel (Special Issue)*, v. 27, June 12, 1954, p. 246-251.

Development of sloping-end furnace. Flow patterns in model and full-scale furnaces. Photographs, diagrams. 15 ref. (D2)

300-D. Economics of Melting. The Battelle Electric Furnace Report Reconsidered. J. C. Howard. *Iron & Steel (Special Issue)*, v. 27, June 12, 1954, p. 252-255.

Reviews "Comparative Economics of Open-Hearth and Electric Furnace for the Production of Low Carbon Steel". Considers application of conclusions to conditions in Great Britain. Photographs, tables. 5 ref. (D2, D5)

301-D. Graphite Electrodes. Some Factors Affecting Their Wear in Service. *Iron & Steel (Special Issue)*, v. 27, June 12, 1954, p. 269-272; disc., p. 324-327.

Mechanism of wear. Nondestructive testing of electrodes. Tables, graphs, photographs, diagram. (D5, Q9, C)

302-D. Fairless Works. United States Steel's Newest. T. J. Ess. *Iron and Steel Engineer*, v. 31, June 1954, p. F62-F92.

Raw materials, coke plant, blast furnaces, openhearths, rolling mills and tube mills. Photographs, diagram, tables. (D general, F23, F26, ST)

303-D. Determination of the Optimum Current in an Arc Furnace. W. E. Schwabe. *Iron and Steel Engineer*, v. 31, June 1954, p. 87-89; disc., p. 89-90.

Method of setting circuits to match the arc voltage to the impedance. Diagrams, graph. (D5)

304-D. Republic's New Open Hearth Furnaces at Cleveland. E. C. McDonald. *Iron and Steel Engineer*, v. 31, June 1954, p. 99-104; disc., p. 104-106.

Buildings and equipment. Diagrams, photographs. (D2, ST)

305-D. New Open Hearth Furnaces at Stelco. E. T. W. Bailey. *Iron and Steel Engineer*, v. 31, June 1954, p. 91-98; disc., p. 98.

Equipment and operating procedures. Plant layout, photographs, tables. (D2, ST)

306-D. Correlating Blast Furnace Operating Concepts. II. Charles E. Agnew. *Steel*, v. 134, June 21, 1954, p. 142 + 6 pages.

Relationship between burden preparation and smelting capacity. Tables. (To be continued.) (D1)

307-D. New Exothermic Technique for Pouring Ingots. Pierre Venard. *Steel*, v. 134, June 28, 1954, p. 111, 114, 122.

Cast iron hot tops lined with exothermic flat refractory plaques effect a reduction in feedhead and a 10% increase in sound metal above ingot neck. Photographs. (D9, ST)

308-D. Computation of the Rate of Solidification of an Ingot Taking Into Account the Temperature Dependence of the Thermophysical Parameters of the Metal. B. Ya. Lyubov. *National Science Foundation Translation. no.* 227, Feb. 1954, 4 p. (From *Doklady Akademii Nauk SSSR*. v. 92, 1953, p. 763-766.)

Previously abstracted from original. See item 129-D, 1954. (D9)

309-D. On the Best Ways of Deoxidizing Molten Steel. W. Koch and F. Wever. *Henry Brutcher, Altadena, Calif., Translation no.* 3268, 18 p. (Condensed from *Stahl und Eisen*, v. 74, no. 5, 1954, p. 264-271.)

Previously abstracted from original. See item 155-D, 1954. (D5, ST)

310-D. Refractories for the Bottom-Pouring of Steel. G. G. Aristov. *Henry Brutcher, Altadena, Calif., Translation no.* 3271, 12 p. (From *Ogneupory*, v. 17, no. 8, 1952, p. 364-370.)

Importance of quality refractories for minimum dirt content in steel ingots. Photographs, tables. 8 ref. (D9, ST)

311-D. Ladle Treatment of Hot Metal for Basic Converter With Oxygen. K. Heinrich. *Henry Brutcher, Altadena, Calif., Translation no.* 3283, 5 p. (From *Revue Universelle des Mines*, v. 96, ser. 9, no. 8, Aug. 1953, p. 637-639.)

Treatment of metal in ladle between blast furnace and steel plant, either before or after the mixer, with 80 to 90% pure oxygen. Graphs, photograph. (D1)

312-D. Developments in Blast Furnace Design. S. K. Nanavati and P. K. Chatterjee. *Indian Institute of Metals, Transactions*, v. 5, 1951, p. 23-46; disc., p. 46-50.

History of blast furnace design and operation. Tables, diagrams. (D1)

313-D. Pig Iron Smelting Without Metallurgical Coke. W. E. Krebs and D. Jagat Ram. *Indian Institute of Metals, Transactions*, v. 5, 1951, p. 51-67; disc., p. 67-76.

New combined rotary kiln process for noncoking coal. Developments in pig iron smelting with oxygen low-shaft furnaces. Photographs, diagrams, graphs. 11 ref. (D1, D8, Fe)

314-D. Ferromanganese Furnace Fumes Cleaned Successfully. C. H. Good, Jr. *Iron Age,* v. 174, July 8, 1954, p. 95-97.

Equipment and methods for cleaning furnace gases at DuquesneWorks of U. S. Steel Corp. Photographs, diagram. (D1, A7)

315-D. Carbide Drilling Speeds Removal of Tough Slag Deposits. D. L. Tunsberg. *Iron Age,* v. 174, July 8, 1954, p. 98-99.

Use of tungsten carbide bits proved fastest and cheapest way of drilling holes for blasting slag from stack of blast furnace. Diagram, photographs. (D1)

316-D. European Oxygen Steelmaking Is of Far-Reaching Significance. H. B. Emerick. *Journal of Metals,* v. 6, July 1954, p. 804-806.

Enrichment of compressed air used in blast furnace operation, enrichment of air blast in bottom-blown basic bessemer practice, prerefining of basic iron in the hot metal ladle, nitrogen-free mixtures of high-purity oxygen and steam in basic bessemer practice and top blowing in solid-bottom basic lined converters. Photographs. 8 ref. (D1, D3, CN)

317-D. Operating Experience With a Two-Foot Diameter Blast Furnace. Russell C. Buehl. *Journal of Metals,* v. 6, July 1954, p. 814-816.

Furnace features, operation on various ores and sinters. Photograph, diagram. 3 ref. (D1)

318-D. Development of Oxygen Steelmaking. Otwin Cuscoleca. *Journal of Metals,* v. 6, July 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, July 1954, p. 817-827.

Review of process and survey of results at two Austrian plants where steel is blown with high-purity oxygen. Photographs, diagrams, graphs, tables. 37 ref. (D3, ST)

319-D. On the Basic Bessemer Process. Pierre Coheur and Hans Kosmider. *Journal of Metals,* v. 6, July 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, July 1954, p. 829-835.

Processes of blowing with oxygen-enriched air or gas mixtures of oxygen and steam allow steelmaker to produce, in a basic converter, a rimmed steel low in nitrogen (0.0020%), phosphorus (0.020%) and sulfur (0.020%). Diagrams, graphs, tables. (D3, CN)

320-D. Comparison of Costs in Openhearth and Electric Furnace Shops. (Digest of "Comparative Economics of Openhearth and Electric Furnaces for Production of Low-Carbon Steel", by S. L. Case, D. D. Moore, C. E. Sims and R. J. Lund; *Electric Furnace Survey Group and Bituminous Coal Research, Inc.* Published by Bituminous Coal Research, Inc., Pittsburgh. *Metal Progress,* v. 66, July 1954, p. 168 + 4 pages.

Comparison of overhead and material costs per ton of ingots. (To be continued.) (D2, D5)

321-D. (French.) **Reducing Wear of Ladle Linings, Particularly by Reducing Amount of Slag.** Pigeau. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 11, no. 6, 1954, p. 1119-1128.

Effects of height of slag layer, shape of ladle and composition of mortar on lining life. Diagrams, tables, graph. (D9)

322-D. (Polish.) **Causes of Premature Failure of Silica Roofs of Openhearth Furnaces.** Stanislaw Pawlowski. *Hutnik,* v. 21, no. 4, Apr. 1954, p. 91-100.

Quality and selection of materials, fire resistant mortar and thickness of seams, surface glaze and effect of overheating and overloading. Tables, graphs, photographs. 17 ref. (D2)

323-D. (Polish.) **Definition of Combustion Zone Before the Tuyere of the Blast Furnace.** Wladyslaw Kuczewski. *Hutnik,* v. 21, no. 4, Apr. 1954, p. 100-102.

Precise formulation based on previous studies. Diagram, graphs. 4 ref. (D1)

324-D. (Polish.) **Use of Steam or Hot Water for Cooling Openhearth Furnaces.** W. Krause. *Hutnik,* v. 21, no. 4, Apr. 1954, p. 108-114.

Design for cooling 60-ton furnace, securing high-pressure steam, utilizing heat of water cooling and products of combustion and utilization of waste heat by use of La Mont boilers. Diagrams, tables, photographs. 4 ref. (D2)

325-D. (Russian.) **Investigation of Desulfurization of Pig Iron by Means of Sodium Carbonate.** O. V. Travin and L. A. Shvartsman. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1953, no. 12, Dec., p. 1804-1812.

Laboratory investigation to establish mechanism and regularities. Application of radioactive sulfur. Tables, graphs. 4 ref. (D1, CI)

326-D. (Book—German.) **(The Preparation of the Blast-Furnace Burden, Including the Blast-Furnace Coke.) Die Vorbereitung des Hochofenmöllers einschliesslich der des Hochofenkokses.** W. Luyken. 377 p. 1953. Springer Verlag, Berlin, Germany. DM 37.50.

Processes used after the mining of the raw materials to make pig iron production more economical. The types of burden materials, preparation of the iron ores and coking coal, preparation and properties of blast-furnace coke, and various installations. (D1, B22, Fe)

E Foundry

415-E. Casting Defects, Their Cause and Methods of Prevention. N. L. Bush. *Australasian Engineer,* 1954, Apr., p. 63-71.

Information of practical use to foundry metallurgist. Graph, photographs. 7 ref.
(E general, Fe, Cu, Al)

416-E. Fish Oils Prove Satisfactory Basic Material for Core Oils. *Canadian Metals,* v. 17, May 20, 1954, p. 28, 30.

Rising cost of linseed oil prompted investigation into use of substitutes. Fish oils satisfactory and even preferable for some foundry applications. (E21)

417-E. Running and Feeding Methods for Grey-Iron Castings. P. A. Russell. *Foundry Trade Journal,* v. 96, May 27, 1954, p. 603-604; disc., p. 604-605.

Production of sound castings. (E23, CI)

418-E. Some Aspects of Shell-Moulding Technique. D. F. Bailey. *Foundry Trade Journal,* v. 96, June 3, 1954, p. 631-637.

Experiences in pilot plant operation. Table, graphs, photographs. (E16)

419-E. Use of Plaster Cores for Casting Torque Converter Parts. *Machinery (London),* v. 84, May 28, 1954, p. 1126-1129.

Size and shape of oil passages formed between blades can be maintained within ±.005 in. Photographs. (E21, Al)

420-E. Founding Non-Ferrous Metals. *Metal Industry,* v. 84, May 28, 1954, p. 465-467.

Operational facilities and procedures at a particular foundry. Photographs. (E general, Cu)

421-E. (Dutch.) **Pressure Casting of Model Aluminum Plates Into Dried Gypsum Molds.** B. W. Sanders. *Metalen,* v. 9, no. 9, May 15, 1954, p. 139-144.

Advantages and differences between Dutch and American processes. Photographs, diagram. (E13, Al)

422-E. (French.) **Investigation of Gas Absorption During Smelting in the Cupola-Furnace Considering Composition of the Charge.** Heinz Siegel. *Fonderie,* 1954, May, no. 100, p. 3947-3951.

Gas content in rough cast iron. Charts, micrographs, table. (E10, CI)

423-E. (German.) **Gas Porosity in Castings. Gasification and Degasification of Melts.** G. Schwietzke. *Giesserei,* v. 41, no. 10, May 13, 1954, p. 254-261.

Present state of research. Graphs, tables, photographs. 29 ref. (E25, Cu, Ni, Zn)

424-E. (German.) **Wear-Resistant Gray Iron, Conditions for Its Correct Casting and Qualitative Evaluation.** Horst Ringpfeil. *Metallurgie und Giesserei Technik,* v. 4, no. 4, Apr. 1954, p. 157-163.

Methods of melting and casting various alloys for optimum wear resistance. Micrographs, graphs. 2 ref. (E10, E11, Q9, CI)

425-E. (Russian.) **Utilization of Oxygen in Melting of Low Carbon and Overheated Cast Iron.** V. A. Fuklev. *Liteinoe Proizvodstvo,* 1954, no. 2, Mar.-Apr., p. 1-3.

Amount of oxygen used depending on gas pressure and charge. Addition of 0.02 to 0.03% aluminum to reduce oxidation during casting. Table, graphs. 5 ref. (E10, CI)

426-E. (Russian.) **Mold Washes for Stainless Steel Casting.** I. R. Kriannin, A. M. Liass, V. O. Iakovlev, I. B. Kumanin and P. A. Borsuk. *Liteinoe Proizvodstvo,* 1954, no. 2, Mar.-Apr., p. 3-7.

Mixtures of sand, clay, sodium silicate, chromite and chromomagnesite. Heat resistant paint and paste for coating inside of molds. Tables, graphs. 6 ref. (E19, SS)

427-E. (Russian.) **Pressure Casting of Brass Parts for Cranes.** V. P. Migai. *Liteinoe Proizvodstvo,* 1954, no. 2, Mar.-Apr., p. 7-8.

Composition and microstructure of brass and casting method. Table, photographs, micrographs. (E13, M27, Cu)

428-E. (Russian.) **Experiments of Mechanization and Improvement of the Lost-Wax Casting Process.** N. S. Kreshchanovskii, M. L. Khenkin, N. K. Levina and M. N. Zimmering. *Liteinoe Proizvodstvo,* 1954, no. 2, Mar.-Apr., p. 8-11.

Wax composition, ceramic coating, casting method and elimination of coating from casting. Diagrams. (E15)

429-E. (Russian.) **Formation of Hot Cracks.** V. G. Liuttsau. *Liteinoe Proizvodstvo,* 1954, no. 2, Mar.-Apr., p. 16-18.

Relation between alloy composition and tendency of crack formation. Tables, diagrams, micrographs, graphs. 2 ref. (E25, Sn, Bi)

430-E. (Russian.) **Sulfur in Magnesium Treated Cast Iron.** V. R. Balinskii. *Liteinoe Proizvodstvo,* 1954, no. 2, Mar.-Apr., p. 18-19.

Quality of casting reduced by sulfur from magnesium sulfide treat-

ment. Tables, micrograph. 3 ref. (E25, CI)

431-E. (Russian.) **Combustion of Fuel in Cupola Furnace.** A. K. Fanbulov. *Liteinoe Proizvodstvo,* 1954, no. 2, Mar.-Apr., p. 21-24.

Influence of type and size of fuel on operation of cupola. Graphs, diagrams, tables. 15 ref. (E10)

432-E. (Swedish.) **Fusion of Chaplets.** K. E. Strand. *Gjuteriet,* v. 44, no. 4, Apr. 1954, p. 63-65.

Benefits of tin coating on chaplets in fusion of carbon steel in gray iron castings. Micrographs, photographs. (E19, CI)

433-E. Drawback Method of Producing Large Compressor Castings. Charles W. Frame, Jr. *American Foundryman,* v. 26, July 1954, p. 40-44.

Equipment, materials and methods. Diagrams, photographs. (E19, CI)

434-E. Slurry System Imroves Sand, Reduces Binder Consumption. *American Foundryman,* v. 26, July 1954, p. 48-51.

Wet method of handling bonding clays for molding sands. Photographs, diagram. (E18)

435-E. Maintenance of Molding Machines. E. W. Greenlees. *American Foundryman,* v. 26, July 1954, p. 52-54.

Daily and weekly routine procedures. Photographs. (E19)

436-E. Lost Wax Process Engineered for Precision Castings. K. J. Yonker. *American Foundryman,* v. 26, July 1954, p. 55-59.

Equipment and methods for melting, preparation of molds and sprues. Photographs. (E15)

437-E. Basic Production Methods for Aluminum Pistons. *Automotive Industries,* v. 110, June 1, 1954, p. 68-69, 104.

Permanent mold method of casting thin-walled parts. Photographs, diagrams. (To be continued.) (E12, Al)

438-E. Test Bars for Copper and Aluminum Base Alloy Castings. Robert A. Colton and Donald L. Lavelle. *Foundry,* v. 82, June 1954, p. 96 + 10 pages.

Mold materials and methods for preparing Webbert and Keel block test coupons. Diagrams, table, photographs. (To be concluded.) (E19, E25, Cu, Al)

439-E. Small Foundry Is Rebuilt Into Mechanized Operation. Robert H. Herrmann. *Foundry,* v. 82, July 1954, p. 78-82, 227-228.

Equipment and methods of small modern foundry. Photographs. (E general, CI)

440-E. Accuracy Is Essential in Casting 280 MM. Artillery Shell. Robert H. Herrmann. *Foundry,* v. 82, July 1954, p. 96-99, 234-237.

Equipment and methods in production of precision alloy steel casting. Photographs, tables. (E11, CI)

441-E. Common Sense in Cores. Warner B. Bishop. *Foundry,* v. 82, July 1954, p. 84-85, 241-243.

Producing cores that will do the prescribed job as economically as possible without wasted overhead, machinery, materials, time or labor. Graphs. (E21)

442-E. Test Bars for Copper and Aluminum Base Alloy Castings. Robert A. Colton and Donald L. Lavelle. *Foundry,* v. 82, July 1954, p. 100-105, 246-251.

Design of test bar patterns, procedure for producing test bars. Photographs, diagrams. (See also item 438-E, 1954.) (E25, Cu, Al)

443-E. Thermit Casting. John Steele. *Foundry Trade Journal,* v. 96, June 10, 1954, p. 657-661.

Abridged from paper presented to Institute of British Foundrymen in South Africa. Procedure and equipment for producing steel castings. Tables. 1 ref. (E16, CI)

444-E. Notable Scottish Foundries. *Foundry Trade Journal,* v. 96, June 17, 1954, p. 685-699.

Equipment and methods. Photographs. (E general, CI)

445-E. Blast Air Moisture Control Improves Cupola Irons. J. L. Brooks. *Iron Age,* v. 174, July 1, 1954, p. 112-113.

Dehumidifying equipment helps offset daily and seasonal changes in humidity which affect quality of irons. Micrographs, diagram, graph. (E10, CI)

446-E. The Outlook for Die Castings. David Laine. *Modern Metals,* v. 10, June 1954, p. 58-59.

Attempts to prove that there has been no large-scale substitution of aluminum for zinc in die castings. Reviews program for increasing use of die castings. Tables. (E13, T general)

447-E. Practical Experiences With Spheroidal Graphite Cast Iron. H. Gries. *Henry Brutcher, Altadena, Calif., Translation no.* 3174, 15 p. (Condensed from *Giesserei,* v. 40, no. 4, 1953, p. 93-103.)

Previously abstracted from original. See item 210-E, 1953. (E25, CI)

448-E. Technique of High-Vacuum Melting and Pouring. O. Winkler. *Henry Brutcher, Altadena, Calif., Translation no.* 3240, 21 p. (From *Stahl und Eisen,* v. 73, no. 20, 1953, p. 1261-1266, 1268.)

Previously abstracted from original. See item 649-E, 1953. (E10, C25, D8)

449-E. Centrifugal Casting of Cutting Tools. J. Doskar. *Henry Brutcher, Altadena, Calif., Translation no.* 3260, 6 p. (From *Slévarenstvi,* v. 1, nos. 1-2, 1953, p. 28-30.)

Development of centrifugally cast milling cutters to take the place of forged and machined units. Tables, photographs. 2 ref. (E14, TS)

450-E. (Dutch.) **Some Experiences With the Shellmolding Method in Casting of Magnetic Steel.** A. J. J. Koch. *Metalen,* v. 9, no. 10, May 31, 1954, p. 157-162.

Properties and advantages of Dutch "Ticanol" alloyed steel for magnet production. Types of resins used in shell molding, details of operation and results. Photographs, table. (E16, CI)

451-E. (French.) **Cupola Melting of Ferrous Materials and the Problem of Carbon in Cast Irons.** J. Pascal. *Métallurgie et la construction mécanique,* v. 86, no. 5, May 1954, p. 385 + 4 pages.

Introduction and bibliography. Table, graphs. (To be continued.) (E10, CI)

452-E. (German.) **The Application of Cement-Sand Molding and of a Special Method in Practice.** W. Fuchs. *Giesserei,* v. 41, no. 11, May 27, 1954, p. 278-283.

Applications, forming of dies, molding shop for steelwork accessories, coremaking and mixtures. Diagrams, photographs, table. (E19)

453-E. (German.) **Physical Tests in Relation to Casting and Gating Practice.** L. Frede and W. Magers. *Giesserei,* v. 41, no. 11, May 27, 1954, p. 283-288.

Pouring speed, flow characteristics in plane channels, tangential and radial flow in annular mold, filling of horizontal and inclined molds and expansion of horizontal cores. Diagrams, graph, photographs. (E23, E22)

454-E. (Hungarian.) **Experiences in Hungary and Abroad on the Production of Centrifugally Cast Cylinder Liners.** Tibor Budinszky and Jozsef Geredi. *Öntöde,* v. 5, no. 5, May 1954, p. 97-102.

Manufacturing process and usual defects of wet and dry liners. Diagrams, tables, micrographs, graphs, photographs. (To be continued.) (E14, CI)

455-E. (Polish.) **Casting of Magnets From Alni and Alnico Alloys.** H. Zakowa. *Prace Instytutow Ministerstwa Hutnictwa,* v. 6, no. 1, 1954, p. 29-35.

Method for preparation of sand molds and casting. Effect of casting temperature and rate of cooling. Tables, grapns, photographs, micrographs. 4 ref. (E11, E25, SG-n)

456-E. Engineering Research Methods and Casting Problems. A. W. Scott. *Foundry Trade Journal,* v. 96, June 24, 1954, p. 711-719, 722.

Reviews problems in heat transfer and stress effects due to thermal, residual and external forces. Diagrams, graphs, photographs. 13 ref. (E general, Q25)

457-E. Studies on Pin Holes in Aluminium. G. P. Chatterjee, K. C. Shome and R. P. Ganguli. *Indian Institute of Metals, Transactions,* v. 5, 1951, p. 311-320; disc., p. 321.

Pinholes in cast aluminum and its alloys are due primarily to hydrogen which on adsorption and diffusion forms bubbles under certain definite conditions. Fundamental concepts on solution, adsorption and diffusion of hydrogen. Graphs, table. 16 ref. (E25, N1, Al)

458-E. Distortion of Die Castings—Causes and Prevention. H. K. Barton. *Machinery (London),* v. 84, June 25, 1954, p. 1352-1360.

Difficulties caused during ejection, core retraction or restriction of die opening. Diagrams. (E13)

459-E. Take a Good Look at Shell Mold Casting. I. William S. Thomas. *Precision Metal Molding,* v. 12, July 1954, p. 35, 69.

What shell molding can and cannot do, advantages and some materials used in shell mold casting. (E16)

460-E. Designers Get Out of a Pickle With Dual-Metal Centrifugal Casting. A. E. Schuh and M. L. Samuels. *SAE Journal,* v. 62, July 1954, p. 33-37.

Based on a technical committee report prepared for Division XXXI —Centrifugal Castings of the SAE Iron and Steel Technical Committee. Advantages of process, six case histories of use. Photographs, micrographs. (E14)

461-E. (Russian.) **Method of Repairing Casting Defects.** B. G. Ivanov. *Liteinoe Proizvodstvo,* 1954, no. 3, May-June, p. 3-5.

Method depends on technological problems, nature of defect and stage of processing. Techniques and conditions for cold electric arc welding, decorative repair and plating. Photographs. 7 ref. (E general, K1, L general)

462-E. (Russian.) **Casting of Iron Drums in Semipermanent Molds.** A. N. Antonov. *Liteinoe Proizvodstvo,* 1954, no. 3, May-June, p. 6-9.

Economy of labor and materials, core and mold preparation, composition of mixtures and properties. Diagrams, tables. (E19, CI)

463-E. (Russian.) **Effect of Casting Technology on Strength of Cast Steel Parts.** N. M. Tuchkevich. *Liteinoe Proizvodstvo,* 1954, no. 3, May-June, p. 9-12.

Result of failure analysis permits broader use of thin-walled castings from low alloy steels. Tables, diagrams, photographs. 2 ref. (E general, CI)

464-E. (Russian.) **Set-Up for Preheating Cupola Blast.** I. P. Petrov. *Liteinoe Proizvodstvo,* 1954, no. 3, May-June, p. 12-14.

Design and operational characteristics of recuperator before and after rebuilding. Diagrams, graphs. (E10)

465-E. (Russian.) **Mechanization of Frame Handling.** M. S. Morozovskii. *Liteinoe Proizvodstvo,* 1954, no. 3, May-June, p. 15.

Design and operation details for mechanical placement and removal of mold frames in tractor plant casting operations. Diagrams. (E19)

466-E. (Swedish.) **Maintenance of Foundry Machinery.** *Gjuteriet,* v. 44, no. 5, May 1954, p. 75-84.

Training and wage system for workers, spare parts, maintenance costs, machine cards and service schedules. Maintenance and lubrication of various foundry equipment. Photographs, diagram. (E general, A6)

467-E. (Swedish.) **Testing Core Masses.** C. E. Gustafsson. *Gjuteriet,* v. 44, no. 5, May 1954, p. 86-88.

Effects of mixing time, water content, specific weight, baking temperature and composition on mechanical and physical properties. Graphs. (E21, P general, Q general)

468-E. (Book.) **Non-Ferrous Foundry Metallurgy.** A. J. Murphy, editor. 500 p. 1954. McGraw-Hill Book Co., 330 W. 42nd St., New York. $12.50. (Also Pergamon Press, Ltd., 242 Marylebone Rd., London N.W. 1. 70s.)

Divided into seven sections, dealing with various aspects of melting and solidification of nonferrous metals and alloys, their properties, testing and production in form of ingots and castings. (E general, C general, EG-a)

F

Primary Mechanical Working

237-F. The Theory and Practice of Wire Drawing. III. The Problem of Rod Diameter. Clement Blazey and V. W. Benjamin. *Australasian Engineer,* 1954, Apr., p. 42-46.

Sizes for steel and aluminum. Experimental data for copper. Diagram, tables, graphs. 10 ref. (F28, ST, Al, Cu)

238-F. Consideration of Heating, Rolling and Annealing as Factors in the Control of Quality Cold Rolled Sheets. H. C. Smith. *Blast Furnace and Steel Plant,* v. 42, June 1954, p. 653-655.

Importance of various factors in production of quality sheets. (F23, J23, CN)

239-F. Forging and Hot Forming. II. George P. Holman. *Industrial Heating,* v. 21, June 1954, p. 1090 + 5 pages.

Heating phase in forging operations and automatic developments in continuous press forging. Tables. 6 ref. (F22, Al, Cu, Mg)

240-F. A Rolling-Mill Loadmeter. S. S. Carlisle and R. B. Sims. *Instruments and Automation,* v. 27, June 1954, p. 940-941.

Continuous measurement of load applied to rolls of strip mill. Photographs, diagrams, table. 5 ref. (F23)

241-F. High Production Mill Rolls Wide Magnesium Plate. W. G. Patton. *Iron Age,* v. 173, May 27, 1954, p. 111-114.

New 84-in. 4-high hot mill is used both for breakdown and semifinishing. No reheating required while rolling from 10 to 0.200 in. Photographs. (F23, Mg)

242-F. Aluminum Cold Forgings. R. A. Quadt. *Machine Design,* v. 26, June 1954, p. 156-160.

Methods and designs for high-volume production of high-strength parts. Photographs, table. (F22, Al)

243-F. A Description of the Plant of T. I. Aluminium Ltd. at Redditch. H. K. Lloyd. *Sheet Metal Industries,* v. 31, no. 326, June 1954, p. 485-507, 537.

Production of aluminum and alloy extrusions and tubes. Photographs, tables, micrographs. (F24, F26, Al)

244-F. Magnesium Widens Its Sheet Rolling Limits. Vance Bell. *Steel,* v. 134, June 7, 1954, p. 108-109.

Equipment and operation of mill for rolling magnesium. Photographs. (F23, Mg)

245-F. Giant Aluminum Ingots Pass Forge Test. W. S. Peterson and J. J. Wegner. *Steel,* v. 134, June 14, 1954, p. 138-139.

Forge pressing of 32x70-in. ingots into 13x42x85-in. plate blooms. Photographs, diagrams. (F22, Al)

246-F. Practice and Control for the Manufacture of High Carbon Commodity Wire. Robert H. Isenberg. *Wire and Wire Products,* v. 29, June 1954, p. 625-627, 666-668.

Patenting, drawing, galvanizing and tempering. Charts. (F28, L16, J25, J29, CN)

247-F. Observations on the Effects of Pre-Plating Hot Galvanized Steel Wire. H. H. Passlot and A. T. Baldwin. *Wire and Wire Products,* v. 29, June 1954, p. 632-634, 668-669.

Low-temperature coatings of lowest zinc-iron alloy content that would permit satisfactory re-forming of hot galvanized wire. Micrographs, tables, diagram. (F28, L16, ST)

248-F. Lubricant Carriers Used in the Drawing of High and Low Carbon Steel Wires. W. Lueg and Karl-Heinz Treptow. *Henry Brutcher, Altadena, Calif., Translation no.* 3244, 17 p. (Condensed from *Stahl und Eisen,* v. 72, no. 20, 1952, p. 1207-1212.)

Previously abstracted from original. See item 320-F, 1952. (F1, F28, ST)

249-F. Surface Defects in the Hot Working of Steel, Resulting From Residual Copper and Tin. K. Born. *Henry Brutcher, Altadena, Calif., Translation no.* 3255, 25 p. (Condensed from *Stahl und Eisen,* v. 73, no. 20, 1953, p. 1268-1277.)

Previously abstracted from original. See item 282-F, 1953. (F general, AY, Cu, Ni, Sn)

250-F. (French.) **Oval-Square Roughing Mills.** Petitfrere. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 11, no. 5, 1954, p. 933-954.

Various designs for continuous and discontinuous trains. Diagrams, tables. (F23)

251-F. (French.) **Use of Steel Regenerators in Rolling Mill Heating Furnaces.** Trevoux. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 11, no. 5, 1954, p. 955-974.

Types, regulation and safety devices. Photographs, diagrams. 10 ref. (F21, F23)

252-F. (Hungarian.) **Modern Pit-Heating Furnaces.** Laszlo Marosvary. *Kohaszati Lapok,* v. 9, no. 5, May 10, 1954, p. 193-207.

Reviews construction and operation of Hungarian, American, Russian and German furnaces. Diagrams. 13 ref. (F21)

253-F. Continuous Aluminium-Extrusion Press for Cable Sheathing. Important Advance in Cable Manufacture. *Engineering,* v. 177, June 18, 1954, p. 794-795.

Extrusion press and process. Diagrams, photographs, micrographs. (F24, Al)

254-F. Hot Forging and Rolling of Iron Castings. C. R. Austin. *Foundry,* v. 82, July 1954, p. 86-89, 244.

Effects on microstructure and mechanical properties. Micrographs, tables, graphs. (F22, F23, M27, Q general, CI)

255-F. Repeaters in a Looping Mill. Practical Experience in Their Use. Hans Wilhelm Riddervold. *Iron & Steel (Special Issue),* v. 27, June 12, 1954, p. 292-294; disc., p. 332-338.

Use of cast iron repeaters without moving parts. Entry, exit and pipe guides. Photographs, diagrams. (F23, CI)

256-F. Swedish Rolling Mills. Use of Roller-Bearings in Mill Design. Axel Leufvén. *Iron & Steel (Special Issue),* v. 27, June 12, 1954, p. 298-301; disc., p. 332-338.

Bearing design, application and lubrication. Diagrams, photograph. (F23)

257-F. Use of Plastic, Castable and Gunning Materials in Soaking Pits. W. D. Rees. *Iron and Steel Engineer,* v. 31, June 1954, p. 59-63; disc., p. 63-67.

Use of these materials resulted in increased efficiency and lower costs. Tables, photographs. (F21)

258-F. Alcoa Starts Operation on Giant Extrusion Press. *Iron and Steel Engineer,* v. 31, June 1954, p. 119-120, 122.

Redesign of press and ingot heating and handling. Production experience. Photographs, tables. (F24, F21, Al)

259-F. Mills at Fairless Use New Methods. G. E. Farrington. *Iron and Steel Engineer,* v. 31, June 1954, p. 125-126.

Innovation involves use of two-high temper mill installed directly in pickle line. Photographs. (F23, ST)

260-F. Packaged Rolling Mill Aids Research. *Iron and Steel Engineer,* v. 31, June 1954, p. 129, 131.

Complete experimental strip, rod and wire mill in one machine. Photographs, table. (F23)

261-F. The Falkirk Rolling Mills of the British Aluminium Company Limited. *Light Metals,* v. 17, June 1954, p. 173-188.

Equipment, plant layout and operating procedures. Melting furnaces, rolling mills heat treating furnaces, finishing and grinding equipment. Photographs. (F23, F21, J general, G general, Al)

262-F. Extruded Aluminium Sheaths for Power Cables. *Metal Industry,* v. 84, June 11, 1954, p. 507-508.

Extrusion equipment. Photographs, diagram, micrographs. (F24, Al)

263-F. Giant Press Opens New Era for Extrusions. *Modern Metals,* v. 10, June 1954, p. 74-76.

Giant 14,000-ton extrusion press capable of extruding four times the weight of aluminum previously possible in one "squeeze". Opens new horizons for extrusion designer. Photographs, diagrams. (F24, Al)

264-F. Forging. *Western Metals,* v. 12, June 1954, p. 86, 88.

Bay area custom forge shop diversifies operations, develops unique tractor. Photographs. (F22, ST, Cu, Al)

265-F. (German.) **Steel for Radially Stressed Heavy Forgings.** Otto Krifka. *Stahl und Eisen,* v. 74, no. 12, June 3, 1954, p. 760-768.

Potential defects and their prevention, ultrasonic tests, ingot casting rates in relation to temperature. Tables, micrographs, photographs, graph. 15 ref. (F22, D9, S13, ST)

266-F. (German.) **Hot-Working of Light Metals.** Fritz Plattner. *Zeitschrift für Metallkunde,* v. 45, no. 5, May 1954, p. 253-256.

Rolling and extrusion. Graphs, diagrams, photographs. 2 ref. (F23, F24, Al)

267-F. Park Gate Iron and Steel Company. 11-In. Continuous Bar Rolling Mill. *Engineering,* v. 177, June 25, 1954, p. 818-821.

Equipment, plant layout and operating procedures. Photographs, diagram. (F23, ST)

268-F. Production of Aluminium Plate and Sheet. *Engineering,* v. 177, June 25, 1954, p. 822-824.

Facilities of Falkirk works of the British Aluminium Co. Inc., including equipment for materials handling, rolling, coiling, annealing and anodizing.. Photographs. (F23, F28, J23, L19, A5, Al)

269-F. Methods of Wire Production. K. V. Aiyer. *Indian Institute of Metals, Transactions,* v. 5, 1951, p. 95-110.

Survey of recent advances in wiredrawing machines, lubricants and dies. Photographs, diagrams, graphs, tables. 7 ref. (F28, F1)

270-F. Forgeability of Steels With Varying Amounts of Manganese and Sulphur. C. Travis Anderson, V. V. Donaldson, Robert W. Kimball and Francis R. Cattoir. *Journal of Metals,* v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, July 1954, p. 835-837.

Tests on series of high-purity Fe-C alloys with carefully controlled additions of sulfur and manganese. Graph, table. (F22, CN)

271-F. Heavy Presses Near Completion. Arthur H. Allen. *Metal Progress,* v. 66, July 1954, p. 81-85.

Design and construction progress of hydraulic forging presses of 18,000, 35,000 and 50,000-ton capacity. Photographs, tables. (F22, Al)

272-F. (Czech.) **Development of Rolling Theory.** Fr. Wiesner. *Hutnické Listy,* v. 9, no. 5, 1954, p. 258-268.

Effects of temperature, rolling speed and composition of steel. Difficulties in obtaining valid formulas. Tables, graphs, diagrams, photographs. 18 ref. (F23, ST)

273-F. (French.) **Commission of Engineers for the Utilization of Fuels and of Rolling Mills for Special Steels. I. The Heating of Rolling-Mill Furnaces.** Hautcolas. **II. Regenerators.** Szczeniowski. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 11, no. 6, 1954, p. 1129-1157.

Fuel oil heating, utilization of waste heat, economy and construction problems. Diagrams. Photographs. (F1, F23, Fe)

274-F. (Russian.) **Investigation of Forging, Stamping and Rolling of Cast Iron With Spheroidal Graphite.** E. P. Unksov and D. I. Berezhkovskii. *Vestnik Machinostroeniia,* v. 33, no. 12, Dec. 1953, p. 29-35.

Results of workability investigations. Graphs, photographs, micrographs. 5 ref. (F22, F23, G3, CI)

275-F. (Book.) **Instrumentation and Control of Mill Furnaces.** 34 p. British Iron and Steel Research Association, 11 Park Lane, London, W.1, England. 5s.

Selection, installation, maintenance, and operation of instruments for rolling mill furnaces. (F23, F21, S16, S18)

G
Secondary Mechanical Working

346-G. Chemical Milling. *Aero Digest,* v. 68, June 1954, p. 25-26.

Use of acid etching to produce tapered sheets, waffle grid sections and other shapes that are difficult or expensive to machine. Photographs. (G general)

347-G. Low-Cost Plastic Dies Take on More Forming Jobs. W. G. Patton. *Iron Age,* v. 173, June 10, 1954, p. 115-117.

Production, product quality and life of dies for steel forming. Photographs, table. (G general, ST)

348-G. Springback in Metal-Forming. Federico Strasser. *Iron & Steel,* v. 27, June 1954, p. 235-236, 240.

Variation of spring steel and phosphor bronze, hard steel, medium hard steel and hard brass, soft steel, soft brass and medium hard aluminum and zinc. Diagrams, tables. (G general, ST, Cu, Al, Zn)

349-G. Laboratory Evaluation of Metal-Forming Lubricants. R. S. Barnes and T. H. Cafcas. *Lubrication Engineering,* v. 10, May-June 1954, p. 147-150.

Tensile-test machine adapted, by proper choice of test-piece size and die design, for evaluating lubricants for cup drawing, wire drawing and rolling. Photographs, tables. 3 ref. (G21, F1)

350-G. Improved Machinability in New Leaded Alloy Steel. W. E. Falberg. *Materials & Methods,* v. 39, June 1954, p. 90-92.

Method permits 25 to 50% faster cutting speeds. Lead acts as lubricant between cutting tool and chip. Photographs, tables. (G17, AY)

351-G. Killed Basic Bessemer Steel Has Good Cold Forming Qualities. Hubert Hauttmann. *Materials & Methods,* v. 39, June 1954, p. 142-144. (Translated from the German.)

Mechanical properties, effect of heat treatment and comparison with other steels. Table, photograph, graphs. (G general, Q general, J general, ST)

352-G. Controlling Machine Tools Automatically. Frederick W. Cunningham. *Mechanical Engineering,* v. 76, June 1954, p. 487-490.

Automatic controls, developed to speed up production, range from mechanical to electronic devices. (G17)

353-G. New Cold Forming Process Saves Time and Material. Claus L. Sporck. *Product Engineering,* v. 25, June 1954, p. 186-189.

Combination of roll forming and spinning produces parts difficult or impractical to make by deep drawing. Micrographs, diagrams, photographs. (G11, G13, G4)

354-G. Electrospark Machining. *Product Engineering,* v. 25, June 1954, p. 288-290, 292.

Abstracted from "Electrospark Machining—Metal Removal Without Contact" by C. Paul Porterfield, paper presented at 18th Annual Machine Tool Electrification Forum, Westinghouse Electric Corp., Buffalo, April 1954. Contact-initiated discharge, electrolytic and spark-initiated discharge methods of electro-machining. Diagrams. 6 ref. (G17)

355-G. Electric Spark Machining. D. W. Rudorff and H. Drubba. *Research,* v. 7, June 1954, p. 216-220.

Method of machining metallic surfaces based on material removed by sparks. Applicable to drilling, cutting and grinding. Diagram, photograph. 14 ref. (G17)

356-G. Drilling With Twist Drills. Carl J. Oxford, Jr. *Screw Machine Engineering,* v. 15, June 1954, p. 43-46.

Investigates what actually happens at the drill cutting edges and under the chisel edge. Micrographs, photographs, diagrams, graphs. (G17)

357-G. Data Sheet 11-SS. Speeds & Feeds for Stainless Steel. *Screw Machine Engineering,* v. 15, June 1954, p. 69-71.

Data for turning, skiving, shaving, trepanning, box milling and forming. Tables. (G17, SS)

358-G. Pick the Right Carbide Tool. Bennett Burgoon, Jr. *Steel,* v. 134, June 7, 1954, p. 124-126.

Cutter selection must be equated to job requirements. Tool type, shape and carbide grade. Grade choice can be based on wear characteristics. Diagrams, table. (G17, C-n)

359-G. How to Form Titanium. C. I. Bradford. *Steel,* v. 134, June 7, 1954, p. 136-137.

Metal resists sudden movement but good results are obtained by working slowly. Photograph, diagrams. (G general, Ti)

360-G. Controlling Burr Formation in Stampings. Federico Strasser. *Steel Processing,* v. 40, June 1954, p. 361-363, 390.

Natural, variable and accidental causes. Diagrams. (G3)

361-G. Selecting the Right Drawing Compound for the Job. Frank M. Aldridge. *Tooling and Production,* v. 20, June 1954, p. 56-57, 178.

Review of soap and oil compounds. Diagrams, check list. (G21)

362-G. Exploratory Tests of the Air-Carbon Arc Cutting Process. A. R. Hard. *Welding Journal,* v. 33, June 1954, p. 261S-264S.

Removal of defective areas from metal parts and back gouging of welds in steel, stainless steel and aluminum. Tables, diagrams, photographs. (G22, ST, SS, Al)

363-G. Effect of Lubricants Upon Coefficient of Friction in the Deep Drawing of Metals. S. Ya. Veiler and G. I. Epifanov. *Henry Brutcher, Altadena, Calif., Translation no.* 3248, 6 p. (From *Doklady Akademii Nauk SSSR,* v. 92, no. 3, 1953, p. 593-595.)

Previously abstracted from original. See item 162-G, 1954. (G21, ST, Cu, Zn)

364-G. (French.) **Microwelding of Built-Up Edge and Its Influence on the Average Temperature of the Tool-Metal Interface.** Félix Eugene. *Comptes rendus,* v. 238, no. 20, May 17, 1954, p. 1965-1966.

Machining tests with and without lubrication explain the nature of the fusion phenomena. Graph. (G17)

365-G. (German.) **Powder Gas Cutting, Its Development and Application.** Bruno Trzeciak. *Metallurgie und Giesserei Technik,* v. 4, no. 4, Apr. 1954, p. 179-182.

Physical and chemical basis for the process. Advantages and difficulties of iron powder cutting. Equipment used. Table, diagram, photograph, micrographs. (G22, ST, Fe)

366-G. (Russian.) **Investigation of Wear of Cutting Tools With Marked Atoms.** E. P. Nadeinskaia. *Vestnik Mashinostroeniia,* v. 34, no. 4, Apr. 1954, p. 40-50.

Principles of method and equipment used. Effects of time, speed, cooling and depth of cut. Diagrams, graphs, photographs. (G17, Q9)

367-G. (Russian.) **Study of Tool Wear by Means of Radioactive Isotopes.** N. F. Kazakov. *Vestnik Mashinostroeniia,* v. 34, no. 4, Apr. 1954, p. 50-56.

Installation and method of determining wear. Effects of various cutting parameters. Table, graphs, micrographs, photographs. 6 ref. (G17, Q9)

368-G. Hardening of Steel by Low Temperature Treatment. II. Antoni Niedzwiedski. *Canadian Metals,* v. 17, May 20, 1954, p. 45-46.

Cooling of cutting oils increases tool life and output. 16 ref. (G17, G21, TS)

369-G. Spinning of Metals. *Canadian National Research Council, Technical Information Service Report no.* 37, Mar. 1954, 20 p.

Critical review of literature from 1944 to 1953. (G13)

370-G. Reciprocal or Pendulum Milling. R. Dies. *Engineers' Digest,* v. 15, June 1954, p. 235-237. (From *Werkstatt und Betrieb,* v. 87, no. 4, Apr. 1954, p. 157-160.)

Advantages and limitations. Diagrams. (G17)

371-G. Titanium: Air Force Machinability Report. III. *Iron Age,* v. 173, June 10, 1954, p. 122-124.

Belt and wheel grinding techniques for finishing complex titanium parts. Photographs, graphs. (G17, Ti)

372-G. Develop New Method for Cold Rolling Splines. W. G. Patton. *Iron Age,* v. 173, June 24, 1954, p. 110-112.

New cold rolling technique developed by Michigan Tool Co. for splines, grooves and serrations promises better surface finish, reduction for hobbing and complete elimination of chip disposal. Photographs. (G11)

373-G. Design Tooling for Complete Automation. W. G. Patton. *Iron Age,* v. 174, July 1, 1954, p. 114-116.

Transfer press dies have solved problem of producing large volume of deep drawn pressed metal parts without manual handling between operations. Photographs, diagrams. (G4)

374-G. Increase Tool Life in Machining Nickel Plate. Norman Zlatin and W. H. Prine. *Iron Age,* v. 174, July 1, 1954, p. 118-120.

Optimum cutting speeds and tool geometry for machining electrodeposited nickel. Graphs, tables. (G17, Ni)

375-G. Machining Hard Materials by Ultrasonics. *Mechanical World and Engineering Record,* v. 134, June 1954, p. 260-261.

Machines for drilling, shaping, etc. of glass, ceramics, tungsten carbide, diamond and the like. Photographs, diagram. (G17)

376-G. Trends in Mechanical Press Design. Ernest C. Morse. *Modern Industrial Press,* v. 16, June 1954, p. 29 + 8 pages.

Developments in past decade and forecast of future improvements. Photographs. (G1)

377-G. How to Tool Up for Aluminum Cutting. Ralph Wohlforth and Walter Bloss. *Steel,* v. 134, June 28, 1954, p. 116-118.

Tool shapes for various machining operations. Diagrams, tables. (G17, Al)

378-G. Correcting Carbide Tool Troubles. David C. Kauffman. *Tool Engineer,* v. 33, July 1954, p. 35-42.

Ways of correcting tool burning, breaking, chipping and excessive wear, cratering, chip clogging and rough finish of workpiece. Photograph, diagrams. (G17)

379-G. Cam-Actuated Dies Promote Economy. Arthur J. Stockwell. *Tool Engineer,* v. 33, July 1954, p. 67-70.

Circular and semicircular cams for dies stamping precision regulator parts. Photograph, diagrams. (G3)

380-G. The Tool Engineer Reference Sheets. Classification of Cutting Fluids by Use. R. G. Moyer. *Tool Engineer,* v. 33, July 1954, p. 83-84.

Abstracted from paper 22T1, "Rolled Extrusion of Thin-Walled Parts", presented at the 22nd ASTE Annual Meeting. Classifies metals by machinability ratings and lists operations by severity. Table. (G21, G17)

381-G. Press Working the Aluminum Alloys. Lester F. Spencer. *Tooling and Production,* v. 20, June 1954, p. 45-47, 172, 182.

Formability and drawing procedures. Tables, photographs, diagram. (To be continued.) (G1, G4, Al)

382-G. Coolant Filtration. George Cantelo. *Western Metals* v. 12, June 1954, p. 58-60.

Central coolant filtration system gives near 100% oil recovery. Diagram, photographs. (G21)

383-G. Machining. *Western Metals,* v. 12, June 1954, p. 78-79.

Lighter, stronger jet plane sections machined on new Douglas Behemoth. Photograph. (G17, Al)

384-G. Cutting. *Western Metals,* v. 12, June 1954, p. 84.

'Amazing Monstrosity' saw cuts 120 miles of aluminum without any resharpening. Photographs. (G17, Al)

385-G. Negative Lubricating Action of Some Liquid Media in the Deep Drawing of Metals. S. Ya. Veiler. *Henry Brutcher, Altadena, Calif., Translation no.* 3251, 7 p. (From *Doklady Akademii Nauk SSSR,* v. 83, no. 5, 1952, p. 709-712.)

Previously abstracted from original. See item 310-G, 1952. (G4)

386-G. Effect of Water and Alcohol on the Grinding of Metals. V. D. Kuznetsov and V. D. Taranenko. *National Science Foundation Translation, no.* 181, Jan. 1954, 4 p. (From *Doklady Akademii Nauk SSSR,* v. 92, 1953, p. 49-52.)

Previously abstracted from original. See item 46-G, 1954. (G18, Al, Cu, Zn)

387-G. (French.) **Drilling, Trepanning, and Cutting Methods.** R. Canet. *Technique et science aéronautiques,* 1954, no. 1, p. 44-51.

Application to flat and flanged sheets. Materials and molding of templets. Cutting and punching tools. Photographs. (G17)

388-G. (German.) **Self-Excited Vibrations of Machine Tools.** J. Tlusty. *Acta Technica Academiae Scientiarum Hungaricae,* v. 8, nos. 3-4, 1954, p. 319-360.

Characteristic properties established by measurements and tests on all main types of machines. Photographs, graphs, diagrams. (G17)

389-G. (German.) **Belt or Wheel Grinding? III.** G. Pahlitzsch and H. Windisch. *Metalloberfläche,* Ausgabe A, v. 8, no. 6, June 1954, p. 87-92.

Advantages and disadvantages of both systems. Graphs. 18 ref. (G18)

390-G. (Russian.) **Modification of High-Alloy Cast Steels.** N. D. Tiuteva and V. T. Svishchenko. *Doklady Akademii Nauk SSSR,* v. 96, no. 1, May 1, 1954, p. 119-120.

Improved cutting properties with small additions of boron. Tables. 4 ref. (G17, TS)

391-G. Titanium Is Unorthodox When Machined. Here's Why. M. Eugene Merchant, E. J. Krabacher, H. W. Young and J. H. Miller. *American Machinist,* v. 98, July 5, 1954, p. 118-121.

Machining characteristics of titanium include better surface finish, lower forces and power consumption but shorter tool life than with steel. It has thinner, more irregular chips and definite shear planes. Photographs, graphs, diagram, micrographs. (G17, Ti)

392-G. Cope Talks on Draw Dies. XIV. Three Shell Jobs Typify Ironing Operations. Stanley R. Cope. *American Machinist,* v. 98, July 5, 1954, p. 126-128.

Application of dies. Rules for ironing speeds and permissible reductions. Photographs, diagrams. (G4, CN, Al)

393-G. Production Problems on Supersonic Planes. Anderson Ashburn. *American Machinist,* v. 98, July 5, 1954, p. 129-144.

Developments in machining, forming, extrusion, assembly and heat treatment of aluminum alloys. Photographs. (G general, J general, Al)

394-G. Reference Book Sheet. Reasons for Carbide-Tool Failure. IV.-VI. W. L. Kennicott. *American Machinist,* v. 98, July 5, 1954, p. 155-157, 159.

Examples of tool failures and how they were analyzed and corrected. Photographs. (G17, S21)

395-G. Gear Shaving Insures Close Backlash Control. William Newell. *Iron Age,* v. 174, July 8, 1954, p. 104-106.

Machining and inspection of close-tolerance gearing. Photographs. (G17, S general, CI, AY)

396-G. Lockheed Uses Epoxy Resins for Various Kinds of Tooling. G. J. Walkey. *Machinery,* v. 60, July 1954, p. 168-173.

Advantages and use of epoxy resins in punches, dies, stretch-form blocks, templates and work fixtures. Photographs. (G general)

397-G. Fabricating High Temperature Metals Into Jet-Engine Afterburners. Lawrence Limbach. *Machinery,* v. 60, July 1954, p. 174-181.

Manufacturing methods used by the Ryan Aeronautical Co. Welding, machining and heat-treating operations. Photographs. (G17, K general, J general, SG-h)

398-G. North American's Present Hydroforming Practice. Fred Koeller. *Machinery,* v. 60, July 1954, p. 190-195.

Equipment and methods, typical examples of work produced. Photographs, diagrams. (G8)

399-G. New Metal-Shop Methods at Convair. H. D. Cromartie. *Machinery,* v. 60, July 1954, p. 196-201.

Improved production methods in impact and hydraulic forming. Photographs. (G1)

400-G. Precision Machining of Small Gas Turbines. F. H. Minturn. *Machinery,* v. 60, July 1954, p. 212-217.

Techniques and tooling for close-tolerance machining of heat and corrosion resisting alloys. Photographs. (G17, SG-g, h)

401-G. A Closer Look at Impact Extrusion. Keith Wilhelm. *Product Engineering,* v. 25, July 1954, p. 129-133.

Advantages and sizes, tolerances and surface finish of extrusions. Photographs, diagrams, graph, table. (G5, Al, CN)

402-G. Machining Advances Forced by New Landing Gear Needs. G. E. Beringer. *SAE Journal,* v. 62, July 1954, p. 61-65.

Excerpts from paper "Manufacturing Requirements for Producing the Modern Landing Gear" presented at SAE National Aeronautic Meeting, Los Angeles, Oct. 1, 1953. Machining on a three-dimensional

contour milling machine, machining of high-strength steels, automatic machining methods. Photographs, graph. (G17, AY)

403-G. The Case for Cold Heading. D. H. Samuelson. *Steel,* v. 135, July 12, 1954, p. 110-111.

Review of cold heading operations, costs and materials. Diagrams, photographs. (G10, CN, AY)

404-G. Turret Change Speeds Setup. E. A. McKee. *Steel,* v. 135, July 12, 1954, p. 146-147.

Instead of changing tools in turret lathes, a complete change is made—turrets and all. Result is shorter setup time and easier tool maintenance. Photographs. (G17)

405-G. Cast Aluminum Plate; a Versatile Tooling Material. Kirby F. Thornton. *Tooling and Production,* v. 20, July 1954, p. 46-48, 70, 133.

Application and fabrication of aluminum stretch-forming dies and inspection jigs and fixtures. Photographs, diagrams. (G9, G17, Al)

406-G. Press Working the Aluminum Alloys. II. Lester F. Spencer. *Tooling and Production,* v. 20, July 1954, p. 50-53, 128.

Detailed operational techniques for various types of forming and bending procedures. Photographs, tables. (G1, Al)

407-G. High Speed Steel Saw Bands. H. J. Chamberland. *Tooling and Production,* v. 20, July 1954, p. 85-142.

Use of improved semi-automatic machines results in increased production and lower costs in band machining. Tables. (G17, TS)

408-G. (Russian.) **Evaluation of Drawing Properties of Sheet Metal for Hollow Parts of Complex Form.** A. V. Altykis. *Vestnik Machinostroeniia,* v. 33, no. 12, Dec. 1953, p. 41-45.

Stress distribution and nature of failure in deep drawings made from various shapes of steel blanks. Diagrams, graphs, photographs. 2 ref. (G4, CN)

409-G. (Russian.) **Equation for the Cutting Force of High Speed Machining of Steel.** A. M. Rozenberg and L. A. Khvorostukhin. *Vestnik Mashinostroeniia,* v. 34, no. 1, Jan. 1954, p. 70-74.

Experimental verification of formula. Tables, graphs. 3 ref. (G17, TS)

410-G. (Russian.) **Problem of Chip Breaking.** V. A. Zemlianskii. *Vestnik Mashinostroeniia,* v. 33, no. 12, Dec. 1953, p. 77-82.

Method of calculating chip breaking process and criterion of its deformation which permits separation of curling and breaking zones. Diagrams, graphs, tables. 20 ref. (G17)

411-G. (Book.) **Cutting Speed Versus Tool Life When Shaping Titanium With High Speed Steel Tools.** 21 p. U. S. Dept. of Commerce, PB 111299, Office of Technical Services, Washington 25, D. C. $1.00.

Results of tool-life tests on a shaper at constant cutting depth of 0.05 in. and feed rate of 0.01 in. per stroke. (G17, Ti)

412-G. (Book.) **Effect of Side Rake Angle on Tool Life in Turning Titanium.** 62 p. U. S. Dept. of Commerce, PB 111297, Office of Technical Services, Washington 25, D. C. $1.50.

Angles from −8 to 40°. (G17, Ti)

413-G. (Book.) **Effect of Size of Cut on Tool Life in Turning Titanium.** 56 p. U. S. Dept. of Commerce, PB 111298, Office of Technical Services, Washington 25, D. C. $1.25.

Tool-life curves for high-speed tools at various feed rates and cutting depths. (G17, Ti)

414-G. (Book.) **Forming and Bending Kaiser Aluminum.** Kaiser Aluminum & Chemical Sales Inc., 919 North Michigan Blvd., Chicago 11, Ill.

Forming with hydraulic and mechanical presses; tensile and compressive forming; spinning; bending with hand and power operated equipment. (G1, Al)

415-G. (Book.) **New Processes for Machining and Grinding.** 52 p. 1953. National Research Council, U. S. Dept. of Commerce, PB 111243, Office of Technical Services, Washington 25, D. C. $1.00.

Electro-sparking, electro-arcing, electrolytic, and ultrasonic abrasion processes. New developments in silicon carbide belt and wheel grinding and diamond wheel grinding. (G18)

416-G. (Book.) **Power Hacksaw Operations on Titanium and Its Alloys.** 33 p. U. S. Dept. of Commerce, PB 111300, Office of Technical Services, Washington 25, D. C. $1.00.

Results of tests with four pitch saws operating at three different speeds. Saw materials were tungsten and molybdenum high speed steel. (G17, Ti)

417-G. (Book.) **Preliminary Report on the "Cutting Characteristics of Titanium".** 30 p. U. S. Dept. of Commerce, PB 11295, Office of Technical Services, Washington 25, D. C. $1.00.

Machining test data on chip formation, microhardness, tool life, and cutting force. (G17, Ti)

418-G. (Book.) **Tool Life Versus Nose Radius When Turning Titanium.** 29 p. U. S. Dept. of Commerce, PB 111301, Office of Technical Services, Washington 25, D. C. $1.00.

Cutting speed; tool life tests with varying nose sizes. (G17, Ti)

419-G. (Book—German.) **Construction, Capabilities, and Industrial Utilization of Machine Tools.) Aufwand, Leistung und Wirtschaftlichkeit Neuzeitlicher Werkzeugmachinen.** 188 p. 1953. Verlag W. Girardet, Essen, Germany. DM 36.

Reduction of tool-wear temperature distribution at cutting edges, machining properties as related to structure, tool vibration, electrical controls, variable drives, and economic considerations. (G17)

H

Powder Metallurgy

103-H. Silicon-Base Cermets and Related Observations. B. C. Weber and P. S. Hessinger. *American Ceramic Society, Journal,* v. 37, June 1954, p. 267-272.

Cermets in the system silicon-titanium dioxide and silicon-titanium carbide investigated along with combinations of titanium carbide and titanium silicides. Photographs, X-ray patterns, graph. 19 ref. (H general, Si, Ti)

104-H. Production of Aluminium Powder and Paste in India. H. S. Amin. *Indian Institute of Metals, Transactions,* v. 6, 1952, p. 285-294; disc., p. 294-295.

Hall process employed in manufacture of aluminum paste for use in paints. Properties and specification of aluminum pigments. Table, flow sheet. 10 ref. (H10, Al)

105-H. Recent Powder Metallurgy Developments. Henry H. Hausner. *Industrial Heating,* v. 21, June 1954, p. 1098, 1100.

Application of metal compounds for production of large-sized products. (H general, Zr)

106-H. (French.) **Differences Between Cathodic Atomization of Electrolytes and Pulverization of Metals.** Pierre Barret. *Comptes rendus,* v. 238, no. 19, May 10, 1954, p. 1883-1885.

Powdered sodium produced by electrolysis of fused salts. 3 ref. (H10, Na)

107-H. (French.) **Comparison of Methods of Microscopic and Micro-Radiographic Examination in the Study of Diffusion by Sintering of Iron Powder of Different Origin.** Georges Cizeron. *Métaux, Corrosion-Industries,* v. 29, no. 344, Apr. 1954, p. 167-180.

Mechanical properties and porosity of structure. Tables, micrographs, diagrams. 7 ref. (H15, Q general, N1, Fe)

108-H. (English.) **A Fundamental Investigation of the Mechanism of Sintering.** E. B. Allison and P. Murray. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 487-512.

Data on sintering of fluorides by a continuous, dilatometric method, and effects of initial compacting pressure and particle size distribution of powder. Measurement of flow properties of glass and sodium fluoride at elevated temperatures and subsequent comparison of flow constants with those deduced from sintering data. Tables, graphs, diagrams. 8 ref. (H15, B)

109-H. (English.) **Experimental Iron Carbonyl Powders.** F. E. Jaumot, Jr., and L. Muldawer. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 513-519.

Strain and crystallite size determined by method of Warren and Averbach. Graphs, tables. 12 ref. (H11, Fe)

110-H. (French.) **Sintered Thermionic Cathodes Made of Nickel and Alkali Earth Oxides.** G. Mesnard and R. Uzan. *Vide,* v. 9, no. 50, Mar. 1954, p. 1492-1507.

Preparation of cathodes by compression and sintering of mixture of coprecipitated barium and strontium carbonates with nickel powder. Technical achievements of experimental tubes and measurements of emission in steady state and pulse operation. Graphs. 4 ref. (H14, H15, T1, Ni)

111-H. (Polish.) **Powdered Magnetic Materials.** W. Rutkowski and H. Rutkowska. *Prace Instytutow Ministerstwa Hutnictwa,* v. 6, no. 1, 1954, p. 20-28.

Production and properties of hard and soft magnets. Tables, graphs, micrographs, photographs. (H general, P16, SG-n, p)

112-H. Sintering Characteristics of Iron-Zinc Powder Blends. A. A. Krishnan. *Indian Institute of Metals, Transactions,* v. 5, 1951, p. 271-281.

Shrinkage, density and hardness of compacts as a function of pressing pressure and sintering temperature. Graphs, photographs, micrographs, table. 6 ref. (H14, H15, Fe, Zn)

113-H. Development of a New Self-Coated Corrosion Resistant Porous Body. A. A. Krishnan. *Indian Institute of Metals, Transactions,* v. 5, 1951, p. 283-293.

"Sweat out" process used to produce bodies from blends of iron and zinc powders. Table, graphs, micrographs. 7 ref. (H general, Fe, Zn)

114-H. Powder Metallurgy Technique for High Density, High Strength Parts. Edmund N. Mazza. *Precision Metal Molding,* v. 12, July 1954, p. 42-45.

Procedure to obtain iron alloys of high density and high strength by alloying during sintering. Tables, graphs. 3 ref. (H15, Fe)

115-H. (English.) **Covering of a Plane Surface With Granular Material.** Z. Bodo and I. Hangos. *Acta Physica Academiae Scientairum Hungaricae,*

v. 3, nos. 3-4, May 30, 1954, p. 155-169.

Degree of covering determined theoretically and checked experimentally for samples of homogeneous grain size. Extension of results to powder mixtures. Graphs, micrographs, diagram. 1 ref. (H general)

J

Heat Treatment

208-J. End-Quench Hardenability and Evaluation of Quenching Media. S. C. Das Gupta and D. S. Eppelsheimer. *Indian Institute of Metals, Transactions,* v. 6, 1952, p. 96-103.

Water, sodium silicate solutions, Gulf Super-quench, Houghton no. 2 Soluble, and Houghto-Quench oils were used. Effect of different media on steels of similar hardenability but different chemical composition. Graphs, tables. 9 ref. (J26, J2, ST)

209-J. Staining of Clad Aluminium Alloy Sheets During Salt-Bath Heat-Treatment. E. C. Williams and H. J. G. Challis. *Institute of Metals, Journal,* v. 82, June 1954, p. 465-470 + 2 plates.

Causes of staining and methods for its elimination in practice. Tables, micrographs, radiograms. 9 ref. (J2, Al)

210-J. Centralize Atmosphere Generators to Improve Furnace Layout. W. D. Latiano. *Iron Age,* v. 173, May 27, 1954, p. 115-117.

Two different atmospheres can be produced to meet varying demands of both forging and heat treating departments. Photographs, plant layout, table. (J2, F21, SG-h)

211-J. Cold Treatment Increases Strength, Stability of Magnet Steels. W. G. Patton. *Iron Age,* v. 173, June 17, 1954, p. 156-158.

Holding at −120° F. for 8 hr. promotes uniformity and decreases retained austenite. Photographs. (J26, AY)

212-J. Basic Principles of Electrode Type Salt Bath Furnaces. Leon B. Rosseau. *Metal Treating,* v. 5, May-June 1954, p. 2-4, 15.

Operating principle, basic characteristics and construction features. Drawings, table, graphs, photograph. (J2)

213-J. Cost Accounting for Heat Treating. Horace C. Knerr. *Metal Treating,* v. 5, May-June 1954, p. 5, 18.

Survey of problem and suggestion of methods and procedures. (J general, A4)

214-J. Anneal Furnace Makes Double Play. W. M. Hepburn. *Steel,* v. 134, June 14, 1954, p. 128-129.

Brass or steel cartridge cases successfully annealed with only a slight variation in furnace cycle. Photographs, diagram, table. (J23, Cu, ST)

215-J. Pusher Furnaces for Heat Treating. E. W. Weaver. *Steel Processing,* v. 40, June 1954, p. 387-390.

Type of drive and method of work loading. Photographs. (J general)

216-J. Oxy-Acetylene Stress-Relieving of Pressure Vessels. Hans Kunz. *Welding Journal,* v. 33, June 1954, p. 288S-294S. (Abstracted from *Schweissen und Schneiden,* v. 6, 1953, p. 216-225.)

Previously abstracted from original. See item 223-J, 1953. (J1, ST)

217-J. (French.) **Role of Hardenability in Selection of Steel for Mechanical Construction.** A. Rabinovicz. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 20, no. 4, Apr. 1954, p. 110-119.

Correlation of hardenability and mechanical properties. Design considerations. Micrographs, diagram, graphs, tables. 20 ref. (J26, Q general, ST)

218-J. (Hungarian.) **The Dissolving of the Ferrite Content of Cast Iron by Heat Treatment.** Nandor Hajto. *Öntöde,* v. 5, no. 5, May 1954, p. 102-104.

Elimination of ferrite from cylinder liners. Table, graphs, micrograph. (J general, N8, CI)

219-J. (Hungarian.) **Isothermal Hardening of Cast Iron.** Miklos Cseh. *Öntöde,* v. 5, no. 5, May 1954, p. 105-113.

Effect on mechanical properties. Applications in industry. Tables, graphs, micrographs. 16 ref. (J26, Q general, CI)

220-J. (Russian.) **Theory and Calculation of Induction Heating.** A. V. Donskoi. *Elektrichestvo,* 1954, no. 5, May, p. 52-58.

Solution of problem of ferromagnetic medium bounded by an infinite plane with varying electrophysical properties. Graphs. 3 ref. (J2, P15)

221-J. Improved Salt Bath Technique for Aluminum. *Light Metal Age,* v. 12, June 1954, p. 14, 36.

Free fall quench process cuts process time 40% and distortion 90%. Photographs. (J2, Al)

222-J. Gaseous Cementation—Carbo-Nitriding and Gas Carburizing. L. G. W. Palethorpe. *Machinery (London),* v. 84, June 18, 1954, p. 1281-1285.

Authoritative review of present industrial practice. Photographs, tables, diagram. (J28, CN)

223-J. Fundamentals of Quenching. I-II. Design for Batch Treatment Systems. Alexander J. Jarema. **III. Interrupted Quench Gives Special Properties.** Norbert K. Koebel. *Steel,* v. 134, June 7, 1954, p. 110-112; June 14, 1954, p. 114-116; June 21, 1954, p. 128-130.

Loads, furnace cycles and methods of operation. Application to austempering, martempering and cyclic annealing operations. Graphs, photographs, diagrams. (J26, J23)

224-J. Below Zero Heat Treatment. Rolland S. Jamison. *Steel,* v. 134, June 28, 1954, p. 104-106.

Procedure and results. Hardening and toughening of steel and aluminum. Photographs, graphs, table. (J26, ST, Al)

225-J. Case Hardening Steel by Carburizing. *Steel,* v. 135, July 5, 1954, p. 62-65.

Application for securing desirable mechanical properties. Photographs, tables. (J28, Q general, ST)

226-J. Precipitation Hardening. I-II. How to Work Stainless the Easy Way. A. L. Field. *Steel,* v. 134, June 28, 1954, p. 100-102; v. 135, July 5, 1954, p. 66-67.

Fabrication of PH grades in the received condition. Subsequent hardening can be done with little danger of scaling and distortion. Strength values are high. Photographs, tables. (J27, SS)

227-J. Heat Treating. *Western Metals,* v. 12, June 1954, p. 80.

Treatment of superhardened struts to control supersonic wings. Photographs. (J general, CN)

228-J. Case Hardening of Steel by Carburizing. Michael B. Bever and Carl F. Floe. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 63-84.

Review of pack, gas and liquid methods. Graphs, tables. 16 ref. (J28, ST)

229-J. Case Hardening of Steel by Carbonitriding and Cyaniding. Michael B. Bever and Carl F. Floe. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 85-100.

Procedures, treatment cycles, atmospheres, furnaces, properties of cases. Micrographs, graphs, table. 22 ref. (J28, ST)

230-J. Case Hardening of Steel by Nitriding. Michael B. Bever and Carl F. Floe. Paper from "'Surface Protection Against Wear and Corrosion". American Society for Metals, p. 101-119.

Processes and equipment, steels for nitriding, structure of cases. Diagrams, graphs, tables, micrographs. 8 ref. (J28, AY, SS, TS)

231-J. Selective Heat Treatment. S. L. Case and H. J. Grover. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 154-162.

High-speed methods for surface hardening of steel parts by induction heating and flame hardening. Economics of processes. Table. 10 ref. (J2, ST)

232-J. (German.) **The Problem of Heat-Treating Steels on the Basis of Their Time-Temperature-Transformation Diagrams.** Franz Wever and Adolf Rose. *Stahl und Eisen,* v. 74, no. 12, June 3, 1954, p. 749-760.

Application of isothermal and continuous cooling curves for determination of processes in specimens of different shapes. Graphs, tables. 19 ref. (J26, N8, AY)

233-J. (Polish.) **Technology of Heat Treatment of Permanent Cast Magnets of Alni, Alnisi, Alnico, and Magnico.** K. Pogorecki. *Prace Instytutow Ministerstwa Hutnictwa,* v. 6, no. 1, 1954, p. 36-43.

Precipitation hardening, aging temperature and time and optimum conditions. Photographs, graphs, tables. 5 ref. (J27, SG-n)

234-J. (Polish.) **Investigations of Sintered Permanent Magnets. I. Sintered Permanent Magnets Without Aluminum.** W. Rutkowski. *Prace Instytutow Ministerstwa Hutnictwa,* v. 6, no. 1, 1954, p. 50-56.

Various methods of heat treatment of sintered magnets of different chemical composition. Magnets with 45% copper, 30% cobalt and 25% nickel with proper quenching and tempering showed best results. Tables, graphs, micrographs. 4 ref. (J general, H general, SG-n)

235-J. Sub-Zero Treatment of Metals. H. T. Gregg, Jr. *General Electric Review,* v. 57, July 1954, p. 19-21.

Applications for assembling operations, control of age hardening and stabilization of precision parts. Use as a supplement to heat treatment. Photograph. (J26, J27, K13)

236-J. Heat Treatment Furnace Developments. Recent Installations for Ferrous and Non-Ferrous Metals. *Metallurgia,* v. 49, no. 296, June 1954, p. 283-300.

Comprehensive review of furnaces for reheating, stress-relieving, annealing, carburizing, hardening and tempering. Photographs, diagrams. (J general)

237-J. Induction Heating Generators as Production Tools. Peter A. Hassell. *Metal Progress,* v. 66, July 1954, p. 94-96.

Design considerations, typical installations and development of new applications. Photographs. (J2)

238-J. Automatic Carbon Control. Harold Ipsen and Edward J. Rupert.

Metal Progress, v. 66, July 1954, p. 98-102.

Instrument and principles for automatic control of carbon potential of atmospheres used in batch-type furnaces. Method uses automatic determinations of dew point to regulate flow of enrichment gas. Results for carburizing and carbo-nitriding treatments for this means of control. Graphs, diagrams, photograph. (J2, J28)

239-J. Annealing of Titanium. E. R. Funk. *Metal Progress,* v. 66, July 1954, p. 103-105.

Proper temperature for annealing cold worked titanium sheet appraised by prestraining tensile samples, annealing 1 hr., and pulling to fracture. Best annealing temperature (1100° F.) gave highest total strain. Graphs, table. (J23, Ti)

240-J. Inert Gas Annealing Puts Zip in Aluminum Strip. *Steel,* v. 135, July 12, 1954, p. 112-113.

Orange peel and earing minimized by annealing in a nitrogen atmosphere. Photographs. (J23, Al)

241-J. (Russian.) **Investigation of Low-Temperature Treatment on Mechanical Properties of Heat Treated High Speed Steel.** V. I. Makarova. *Vestnik Machinostroeniia,* v. 33, no. 12, Dec. 1953, p. 63-66.

Steels of different composition were hardened at 1260 to 1280 and 1300 to 1320° C., annealed in range of 50 to 650° C. and low temperature treated at −78° C. Graphs. (J26, Q general, TS)

242-J. (Russian.) **Annealing Resistance of a Layer Hardened by the Electric Spark Method.** V. N. Tsvibel', B. A. Krupitskii and L. N. Balakina. *Vestnik Mashinostroeniia,* v. 33, no. 12, Dec. 1953, p. 75-76.

Effects of annealing temperature on hardness in layers hardened with different electrodes. Graphs, micrograph. 5 ref. (J23, Q29, CN)

K

Joining

437-K. Sequence Control on Multi-spot Welders. John Sant. *Applied Hydraulics,* v. 7, June 1954, p. 63-64.

Automatic timing of work positioning and locking and actuation of 134 weld guns accomplished with electrically controlled pneumatic and hydraulic circuits. Diagram, photographs. (K3)

438-K. Welding in Canada. R. M. Gooderham. *British Welding Journal,* v. 1, June 1954, p. 245-252.

Developments and improvements in welding processes and techniques, and advancements in education, training and testing of operators. Photographs, diagrams. (K general)

439-K. Some Simple Statistical Methods for Resistance-Welding Investigations. H. E. Dixon and J. E. Roberts. *British Welding Journal,* v. 1, June 1954, p. 276-286.

Use of statistical concepts such as standard deviation, coefficient of variation and confidence limits for evaluating consistency and interpretation of results. Graphs, tables. 17 ref. (K3, S12)

440-K. Spot Welding Machines. Carr Harris. *Canadian National Research Council, Technical Information Service Report no.* 38, Mar. 1954, 14 p.

Bibliography of selected literature. Installation and equipment problems applicable to small shops. 28 ref. (K3)

441-K. Inert Gas Gives Titanium Tubing Protective Weld Backing. J. M. Thompson, Jr. *Iron Age,* v. 173, May 27, 1954, p. 118-119.

Thin-walled titanium tubular assemblies welded successfully, using inert gas inside of intricately shaped sections to prevent atmospheric contamination. Photographs. (K1, Ti)

442-K. Recent Progress in Joining Titanium. I. Welding Titanium. James H. Johnston. **II. Brazing of Titanium.** N. A. DeCecco and John M. Parks. *Materials & Methods,* v. 39, June 1954, p. 107-111.

Problems caused by air contamination and changes in thermal conditions occurring near the joint. Photographs. (K general, Ti)

443-K. Joint Strength Properties of Tin-Lead Alloy Deposits. Vincent P. McConnell. *Plating,* v. 41, June 1954, p. 636-640, 645.

Mass soldering in an automatic process has many advantages. Joint strength of deposits on steel and copper-plated aluminum. Graphs, photographs, table. 8 ref. (K7, Q23, ST, Pb, Sn, Cu, Al)

444-K. You Can Repair-Weld Cast Iron. *Power,* v. 98, June 1954, p. 119-121.

Review of methods, materials and equipment. Photographs, tables. (K general, CI)

445-K. Factors in Welding and Brazing Heat Exchanger Tubes. *Power Engineering,* v. 58, June 1954, p. 94-95.

Joint design and electrode or filler metal selection. Diagrams, table. (K1, K8, SG-h)

446-K. Selection of Soft Solders and Fluxes. H. C. Sohl. *Product Engineering,* v. 25, June 1954, p. 161-167.

Designer should know how solder alloys, fluxes and base metals affect characteristics of a soft solder joint. Photograph, graph, tables, diagrams. 4 ref. (K7, Sn, Pb)

447-K. Inert-Gas Shielded Welding Proves Cost Saver on Steel Tanks. W. L. Wyman. *Steel,* v. 134, June 7, 1954, p. 106-107.

Material costs are higher but lower unit labor costs more than make up the difference. Photographs, diagram, table. (K1, ST)

448-K. Evaluation of Alloys for Vacuum Brazing of Sintered Wrought Molybdenum for Elevated Temperature Applications. Kenneth C. Dike. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3148, May 1954, 13 p.

Twenty-five binary and ternary alloys with liquidus temperatures in the range 2000 to 2500° F. were prepared and evaluated. Tables, diagrams, micrographs. 4 ref. (K8)

449-K. Effect of Power Supply Characteristics on Sigma Welding. W. H. Helmbrecht and R. L. Hackman. *Welding Journal,* v. 33, June 1954, p. 531-536.

Development of a satisfactory supply to provide optimum arc performance and simple control. Oscillograms, graphs. (K1)

450-K. Inert-Gas-Shielded Titanium Brazing. Harlan L. Meredith. *Welding Journal,* v. 33, June 1954, p. 537-542.

Processes, procedures, metallurgical aspects and physical strength data in brazing and soldering titanium to itself and to other metals. Diagram, tables. photographs, micrographs. (K8, Q23, Ti)

451-K. New Results in Tool and Die Welding. Robert Groman. *Welding Journal,* v. 33, June 1954, p. 543-548.

Repair of sharp cutting edges of high-speed tools and chips or cracks in dies and punches. Photographs. (K general, TS)

452-K. High-Speed Motion Picture Photography Applied to Resistance Welding. I. S. Goodman. *Welding Journal,* v. 33, June 1954, p. 548-552.

Pictures of some resistance welding applications to small welds suggest how equipment may be further applied. Graphs, diagrams, photographs. 3 ref. (K3)

453-K. Process Adjustment in Inert-Gas-Shielded Arc Welding. Eugene B. LaVelle. *Welding Journal,* v. 33, June 1954, p. 553-560.

Factors involved in successful fabrication of weldments and their statistical control. Drawings. (K1, S12)

454-K. Current Rectification and High Frequency Interference in Inert Gas Welding. J. G. Murray. *Welding Journal,* v. 33, June 1954, p. 561-563.

Method for preventing undesirable current rectification and high-frequency interference. Diagrams. (K1)

455-K. Research of Welding Arc. M. Ozawa and T. Morita. *Welding Journal,* v. 33, June 1954, p. 280S-284S.

Report on characteristics of welding including self-regulation, material, current, voltage and electrode fall. Graphs, diagrams. 5 ref. (K1)

456-K. Penetration Factors in Metallic Arc Welding. Roger C. Waugh and Otto P. Eberlein. *Welding Journal,* v. 33, June 1954, p. 285S-288S.

Factors controlling penetration of various electrodes and reasons for differences. Diagrams, tables, graph, photograph. 8 ref. (K1, ST)

457-K. The Fatigue Factor in Welded Design. A. Erker. *Welding Journal,* v. 33, June 1954, p. 295S-304S. (Condensed from *Schweissen und Schneiden,* v. 5, 1953, p. 400-417.)

Previously abstracted from original. See item 132-K, 1954. (K general, Q25)

458-K. (Dutch.) **Hard-Soldering of Electronic Apparatus.** E. C. Smits. *Bedrijf en Techniek,* v. 9, no. 202; *Electronica section,* v. 7, no. 149, May 22, 1954, p. 81-83.

Special demands of soldering methods and materials in manufacture of vacuum tubes. Properties and adaptability of various solders. Tables, graphs. (K7)

459-K. (French.) **Welded and Cast Constructions in Large Electric Machines.** Max Andres. *Métallurgie et la construction mécanique,* v. 86, no. 5, May 1954, p. 401 + 4 pages.

Comparative study. Diagrams, photographs. (K general, E general)

460-K. (French.) **Arc-Welding of Self-Hardening Steels. Use of Austenitic Electrodes.** H. Granjon. *Soudure et Techniques connexes,* v. 8, nos. 3-4, Mar.-Apr. 1954, p. 89-99; disc., p. 99-100.

Welding difficulties, crack formation, selection and study of electrodes, characteristics and conditions for using electrodes. Tables, graphs, micrographs, photographs, diagrams. 2 ref. (K1, AY)

461-K. (Russian.) **Spot Welding of 30KhGSA Steel by Two-Impulse Cycle.** D. S. Balkovets, B. D. Orlov and P. L. Chuloshnikov. *Vestnik Mashinostroeniia,* v. 34, no. 4, Apr. 1954, p. 68-71.

Quality and appearance of weld and operation data. Tables, diagrams, micrograph. 4 ref. (K3, ST)

462-K. Butt-Welded Joints in Pipe Ranges. *British Engine, Boiler & Electrical Insurance Co. Ltd., Technical Report, New ser.,* v. I, Nov. 1952, p. 81-89.

Analysis of failures in welds. Incomplete root penetration was most

common defect. Photographs, micrographs. (K general)

463-K. 30 Miles of Structural Welding Yields 15 Percent Steel Saving. Carl L. Kreidler. *Industry & Welding,* v. 27, July 1954, p. 33-35.

Combination of shop and field welding of large, prefabricated sections of factory building. Photographs, diagram. (K general, T26, CN)

464-K. Here's How Low-Alloy High-Tensile Steels Are Arc Welded. C. F. Altenburger. *Industry & Welding,* v. 27, July 1954, p. 40-42.

Electrodes and procedures for arc, submerged arc and gas shield-arc methods. Photographs, table. (K1, AY)

465-K. Ultrasonics Improve Soldered Joints in Aluminum. J. J. Obrzut. *Iron Age,* v. 173, June 24, 1954, p. 97-99.

Ultrasonic equipment powerful enough to effectively shatter oxide films helps to produce strong soldered joints in aluminum without using flux. Photographs, table, micrographs. (K7, Al)

466-K. Titanium Fusion Welded on Production Basis. L. Barrett and H. D. Justis. *Iron Age,* v. 173, June 24, 1954, p. 106-109.

Inert gas-shielded welding. Argon, providing a stabler arc, is used to shield the molten weld puddle while helium is used for backup and for welding in a chamber. Photographs, tables. (K1, Ti)

467-K. Weldability. Assessment by Rapid Dilatation Tests. C. L. M. Cottrell. *Iron & Steel (Special Issue),* v. 27, June 12, 1954, p. 315-317.

Determination of relationship between the temperature at which the austenite-martensite transformation takes place in certain alloy steels and the liability of those steels to this form of cracking. Graphs, tables. (K9, AY)

468-K. How About Welding the Aluminum Alloys? I. Procedures for Spot Welding. Lester F. Spencer. *Welding Engineer,* v. 39, June 1954, p. 51-55.

Resistance welding alloys by spot, seam and flash welding methods. Equipment, preweld cleaning, machine settings and heat problems. Photograph, tables, graphs. 7 ref. (To be continued.) (K3, Al)

469-K. Your Welding Guide. *Welding Engineer (Directory Issue),* v. 39, June 1954, p. 5-40.

Brief data sheets on equipment and procedures for arc, gas and resistance welding. Includes sections on metal properties, grinding of welds and shop practice. Tables, nomograms, charts. (K1, K2, K3)

470-K. Product Classification List. *Welding Engineer (Directory Issue),* v. 39, June 1954, p. 41-124.

Classifications of welding equipment and supplies and kindred items. Names and locations of manufacturers. Table. (K general, A10)

471-K. Trade Name Index. *Welding Engineer (Directory Issue),* v. 39, June 1954, p. 125-149.

Trade names employed by manufacturers of welding equipment and supplies. Names of manufacturers and the product or products to which the trade names refer. Table. (K general, A10)

472-K. Names and Addresses. *Welding Engineer (Directory Issue),* v. 39, June 1954, p. 149-158.

Tabulated data for manufacturers of welding equipment and supplies. (K general, A10)

473-K. Uniwelding at Menasco. Gilbert C. Close. *Western Machinery and Steel World,* v. 45, June 1954, p. 82-86.

Equipment and procedure for hot pressure welding of aircraft components. Photographs. (K2)

474-K. Reactions in Arc Atmosphere During Submerged Automatic Welding. V. V. Podgaetskii. *Henry Brutcher, Altadena, Calif., Translation no.* 3072, 15 p. (From *Avtomaticheskaya Svarka,* v. 6, no. 1, 1953, p. 10-18.)

Relationship between weld porosity and reactions in which hydrogen forms compounds insoluble in liquid steel and stable at the high-arc temperatures. Tables. 27 ref. (K1, ST)

475-K. Ways of Minimizing Porosity of Weld Metal in Submerged Automatic Welding on Construction Sites. A. S. Fal'kevich and V. S. Volodin. *Henry Brutcher, Altadena, Calif., Translation no.* 3075, 8 p. (From *Avtogennoe Delo,* v. 22, no. 3, 1951, p. 21-23.)

Previously abstracted from original. See item 115-K, 1952. (K1, CN)

476-K. Welding With a Consumable Electrode in an Atmosphere of Protective Gases. K. V. Lyubavskii and N. M. Novoshilov. *Henry Brutcher, Altadena, Calif., Translation no.* 3140, 9 p. (From *Avtogennoe Delo,* v. 24, no. 1, 1953, p. 4-8.)

Arc welding of various steels in a shielding medium of inexpensive active (instead of inert) gases. Photographs, radiographs, table. 3 ref. (K1, ST)

477-K. On the Problem of the Most Favorable Calcium Carbonate Content of Electrode Coatings. V. A. Lapidus. *Henry Brutcher, Altadena, Calif., Translation no.* 3225, 8 p. (From *Avtogennoe Delo,* v. 23, no. 11, 1952, p. 10-13.)

Study of ability of calcium carbonate to prevent oxidation of the deposited metal and loss of alloying elements by generating a shielding medium. Graph, photograph, tables. (K1)

478-K. Tests of Bonded and Riveted Sheet-Stringer Panels. Leonard Mordfin and I. E. Wilks. *U. S. National Advisory Committee for Aeronautics, Technical Note,* 3215, June 1954, 45 p.

Axial flat-end compression tests made on panels of 75S-T6 aluminum alloy. Graphs, photographs, diagrams, tables. 7 ref. (K13, Q28, Al)

479-K. The Weldability of Ductile Iron. O. G. Paasche and W. H. Rice. Paper presented at Pacific Northwest Metals and Minerals Conference of the A.I.M.E., 1954, Portland, Ore. 13 p.

Includes tables, charts. (K9, CI)

480-K. (French.) **Practice of Autogenous Argon-Arc Welding.** H. Walser. *Aluminium Suisse,* v. 4, no. 3, May 1954, p. 80-90.

Procedure, electrodes and apparatus. Diagrams, graphs, photographs. (K1)

481-K. (French.) **Electric Resistance Welding, Assembly Process of High Productivity: Its Use in Construction of Aircraft Frames.** G. Moressée. *Technique et science aéronautiques,* 1954, no. 1, p. 11-27.

Technological and economic advantages, assembly techniques, corrosion protection. Photographs, tables, diagrams. (K3, R general, T24)

482-K. (German.) **Arc Welding of Light Metals in Rare Gas Atmosphere.** L. Wolff and W. Mantel. *Aluminium,* v. 30, no. 6, June 1954, p. 233-239.

Rectifying action exerted by the arc during a.c. welding with gas shielding. Weldability of various aluminum and magnesium alloys. Diagrams, tables, photographs, graph. 4 ref. (K1, K9, Al, Mg)

483-K. (German.) **Electric Resistance Welding of Light Alloys.** G. Moressée. *Aluminium,* v. 30, no. 5, May 1954, p. 200-207; no. 6, June 1954, p. 251-257.

Mechanical and electrical systems. Various welding procedures, machine control, applications and advantages. Photographs, tables, diagrams, graph. (To be continued.) (K3, Al)

484-K. (German.) **Cracking of Welds in Aluminum-Based Materials.** A. Müller-Busse. *Aluminium,* v. 30, no. 6, June 1954, p. 240-250.

Crack-tendency of binary, ternary and more complex aluminum-rich alloys. Graphs, micrographs. 21 ref. (K9, Q26, Al)

485-K. (German.) **Is the Use of High Efficiency Electrodes Economical?** Herbert Neumann. *Schweissen und Schneiden,* v. 6, no. 6, June 1954, p. 209-219.

Recent developments, melting time and rate, practical hints and calculations. Tables, graphs, diagrams, photographs. (K1)

486-K. (German.) **Oxy-Acetylene Welding in the Manufacture of Steam Vessels and Piping.** W. Müller. *Schweissen und Schneiden,* v. 6, no. 6, June 1954, p. 220-234.

Preparation, defects, multilayer welds, materials and detailed welding schemes. Photographs, diagrams, tables. (K2)

487-K. (German.) **Increase of Economical Efficiency by Use of Multi-Operator Welding Rectifiers.** Rod. Hofmann and O. Becken. *Schweissen und Schneiden,* v. 6, no. 6, June 1954, p. 234-237.

Mobility of multi-operator device, overload, 2500 amp. device, stationary device for 10,000 amp. and high voltage feeding. Table, photographs, diagram. 1 ref. (K1)

488-K. (German.) **Shrinking by Liquid Oxygen Cooling in Heavy Machine Construction.** Otto Peters. *Schweissen und Schneiden,* v. 6, no. 6, June 1954, p. 240-248.

Operation, materials and economy. Tables, diagrams, photographs, micrographs. (K13)

489-K. (German.) **Resistance Butt Welding of Steel Sheets by Foil Butt Seam Welders.** Ferdinand Busse. *Schweissen und Schneiden,* v. 6. no. 6, June 1954, p. 248-253.

Fundamentals, problems, experimental data. Photographs, diagrams, table. (K3, ST)

490-K. (German.) **Progress in Field of Welding and Cutting.** *Schweissen und Schneiden,* v. 6, no. 6, June 1954, p. 258-260.

Literature review of generalities on brazing, soft soldering or brazing, hard brazing, machines and equipment, fluxes and solders. 133 ref. (K8, K7, G22)

491-K. Fused Vacuum-Tight, Metal-to-Ceramic, Ceramic-to-Glass, Metal-to Glass, and Metal-to-Mica Sealing by Powdered Glass Techniques. N. Anton. *Ceramic Age,* v. 63, sec. I, June 1954, p. 15-16, 18-19; disc., p. 19.

Apparatus and procedure for sealing vacuum tubes. Graphs, photographs. (K11)

492-K. Thread Inserts of 18-8 Stainless for Magnesium Components. (Digest of "Performance Data: Stainless Steel Wire Screw Thread Inserts in Magnesium Applications", by Paul E. Wolfe, presented at ninth annual meeting of the Magnesium Association, New York, Nov. 2, 1953.) *Metal Progress,* v. 66, July 1954, p. 184 + 4 pages.

Improved methods for securely fastening components. Installation procedures and advantages. (K13, SS, Mg)

493-K. Metal to Metal Bonding With Epoxy Resin-Based Adhesives. D. W. Elam. *Product Engineering,* v. 25, July 1954, p. 166-169.

Bond characteristics, strength under static and impact loading and application factors for adhesives that simplify the assembly of sheet metal structures. Photographs, graphs, tables. (K12)

494-K. Unorthodox Methods of Casting Repair. W. H. Lane. *Welding Engineer,* v. 39, July 1954, p. 22-24.

Abstract of paper at 1954 annual meeting of the International Acetylene Association, Chicago, 1954. Use of "dished-out" treatment rather than a deep "V" to prepare edges of castings. Brazing of cast iron without preheating. Photographs. (K8, CI)

495-K. Pressure Welding—How It's Done, Where You Can Use It. *Welding Engineer,* v. 39, July 1954, p. 26-27, 35.

Theory, surface preparation and applications of press welding and roll welding. Dies used. Photographs. (K5)

496-K. Tested and Found Wanting. Wayne Jacobs and Charles Marschall. *Welding Engineer,* v. 39, July 1954, p. 32-35.

Comparison of quality of weld metal deposited by direct current against that deposited by alternating current. Graphs, diagram. (K1, CN)

497-K. Here's the Dope on Slag-Gas-Shielded Arc Welding. Felix Tancula. *Welding Engineer,* v. 39, July 1954, p. 38-39.

Equipment and operating procedures. Photographs. (K1)

498-K. (French.) **Transition Temperature of Brittleness; Quality Criterion of Arc Welding Electrodes.** Daniel Séférian and Marcel Moneyron. *Comptes rendus,* v. 238, no. 23, June 9, 1954, p. 2239-2242.

Classification of coated electrodes. Influence of heat treatments and transition temperature of two welds. Graphs. 2 ref. (K1, Q23, CN)

499-K. (German.) **New Applications of Oxy-Acetylene Welding Techniques.** Valentin Trunschitz. *Schweisstechnik,* v. 8, no. 4, Apr. 1954, p. 37-43.

Flame cutting, rust removal, surface hardening and stress-relief. Photographs. (K2, J2, G22)

500-K. (German.) **Nonfusion Welding of Aluminum and Aluminum Alloys.** G. M. Blanc. *Schweisstechnik,* v. 8, no. 4, Apr. 1954, p. 44-45.

Advantages over standard methods. Photographs. (K6, Al)

501-K. (German.) **Properties and Welding of Ductile Cast Iron.** Heinrich Edel. *Schweisstechnik,* v. 8, no. 4, Apr. 1954, p. 45-46.

Principle, application, advantages and mechanical properties. (K general, Q general, CI)

502-K. (Norwegian.) **Determination of Number and Size of Drops in Electric Arc Welding.** *Teknisk Ukeblad,* v. 101, no. 22, June 3, 1954, p. 507-508.

High-speed photographic study. Diagrams, table. (K1)

503-K. (Russian.) **Features of Formation and Cooling of a Spot Weld When Round Rods Are Cross Connected.** S. A. Adasinskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1953, no. 12, Dec., p. 1856-1862.

Effects of quenching action of adjacent metal. Experiments with 10-mm., low-carbon rods. Graphs, photographs, micrographs. 2 ref. (K3, CN)

504-K. (Russian.) **Strength of Welded Joints.** A. A. Gafanovich. *Sel'khozmashina,* 1954, no. 6, June, p. 21-26.

Chemical composition and strengths of lap and butt welds made by manual and semi-automatic methods. Photographs, diagrams, graphs, tables. (K1, Q23, CN)

505-K. (Russian.) **Fluxes for Semi-Automatic Welding.** K. V. Liubavskii and M. M. Timofeev. *Vestnik Mashinostroeniia,* v. 33, no. 12, Dec. 1953, p. 45-48.

Results of development of two fluxes for low-carbon steel. (K1, CN)

506-K. (Russian.) **Method of Semi-Automatic Welding of Stainless Steel in Assembled Structures.** N. Iu. Pal'chuk and A. I. Akulov. *Vestnik Mashinostroeniia,* v. 33, no. 12, Dec. 1953, p. 48-50.

Results of inclined and vertical welding with solid flux. Tables, photographs, diagram. (K1, SS)

507-K. (Russian.) **Testing Welded Joints by Means of Ring-Shaped Test Pieces.** T. A. Vladimirskii. *Vestnik Mashinostroeniia,* v. 33, no. 12, Dec. 1953, p. 50-51.

Economy and ease of handling. Tables, photographs. (K9)

508-K. (Russian.) **Control of Hot Cracks During Welding.** S. A. Kurkin. *Vestnik Mashinostroeniia,* v. 34, no. 1, Jan. 1954, p. 79-82.

Results of work on automatic welding of low-carbon steel. Graphs, diagrams. 2 ref. (K1, CN)

509-K. (Russian.) **Electric Arc Welding of Bronze.** L. V. Golub. *Vestnik Mashinostroeniia,* v. 34, no. 1, Jan. 1954, p. 85-86.

Electrodes and their coatings. (K1, Cu)

510-K. (Book.) **Solder. Its Fundamentals and Usage.** Clifford L. Barber. 78 p. 1954. Kester Solder Company, 4201 Wrightwood Ave., Chicago 39, Ill.

Solders, fluxes, and flux-core wire solder. Soldering methods. (K7, Sn, Pb)

L
Cleaning, Coating and Finishing

568-L. Preparation of Metal Surfaces for Industrial Finishes. R. C. Gibson. *American Paint Journal,* v. 38, June 21, 1954, p. 28 + 5 pages.

Thorough cleaning of surface to remove foreign material followed by chemical coating treatment are prerequisites to obtaining satisfactory paint performance. 7 ref. (L10, L12, L14)

569-L. Effect of Gelatin on the Changes in Initial Cathode Polarization During Electrodeposition of Copper. B. I. Parsons and C. A. Winkler. *Canadian Journal of Chemistry,* v. 32, June 1954, p. 581-590.

Effects of chloride and gelatin studied by means of a cathode-ray oscilloscope. Graphs. 7 ref. (L17, Cu)

570-L. Protective Coatings for Ships and Marine Installations. J. C. Hudson. *Chemistry & Industry,* 1954, no. 23, June 5, p. 640-651.

Main types of coatings for protection against atmospheric, sea water and soil corrosion. Photographs, graphs, diagrams. 21 ref. (L general)

571-L. Aluminizing of Steel. A. N. Kapoor, A. B. Chatterjea and B. R. Nijhawan. *Journal of Scientific & Industrial Research* v. 13, sec. 13B, Apr. 1954, p. 286-291.

Two-stage process consisting of prior treatment in halide flux bath followed by hot dip in aluminum bath. Tables, micrographs, graph, diagram. 16 ref. (L16, Al, CN)

572-L. Applied Finishes for Aluminium Alloy Die Castings. H. K. Barton and L. C. Barton. *Machinery (London),* v. 84, May 28, 1954, p. 1143-1148, 1153-1154.

Preplating, anodizing, chemical conversion and surface treatments. Tables, photographs, diagram, graph. (L general, Al)

573-L. Where and When to Use Electropolishing. Malcolm W. Riley. *Materials & Methods,* v. 39, June 1954, p. 104-106.

Application for final finish or as preplating operation. Tables, photographs. (L13, SS)

574-L. Conditions for Electrolytic Polishing of Metals and Alloys. S. H. Bush. *Materials & Methods,* v. 39, June 1954, p. 137, 139, 141.

Electrolyte composition, current density, voltage, temperature and time. Table. 57 ref. (L13)

575-L. Plastic Liners for High-Pressure Pipelines. R. G. Deering. *Oil and Gas Journal,* v. 53, June 14, 1954, p. 120-122.

Thin-wall butyrate tubing is latest weapon against internal corrosion. Photographs. (L26)

576-L. How Good Must Pipeline Coating Be? L. G. Sharpe. *Oil and Gas Journal,* v. 53, June 14, 1954, p. 130-132.

Data indicate that optimum costs are attained with a reasonably well-coated line which can be cathodically protected with moderate current quantities. Photograph, table. (L general, R10, ST)

577-L. Management Problems of the Metal Finishing Shop. Bruce E. Warner. *Plating,* v. 41, June 1954, p. 646-648.

Financial, organizational and employee problems. (L general, A6)

578-L. Bright Nickel Process Simplifies Bumper Manufacture. Robert D. Miller. *Products Finishing,* v. 18, June 1954, p. 24-30, 32.

Production of finishes to withstand scuffing, abrasion, traffic wear-and-tear and corrosive effects of weather and road clearing chemicals. Photographs. (L17, Ni)

579-L. Automotive Paint Processes and Equipment. R. E. VanDeventer. *Products Finishing,* v. 18, June 1954, p. 40 + 8 pages.

Surface preparation, primer and color coat application. (L26)

580-L. Tin Immersion Coating. C. Fred Gurnham. *Products Finishing,* v. 18, June 1954, p. 74 + 9 pages.

Hot dipping, electroplating, and immersion processes on aluminum and steel wire. Table. (L16, L17, Sn, Al, ST)

581-L. Pushbutton Water Demineralization Accelerates Tinplate Production. John K. Sargent and J. W. Stewart. *Steel,* v. 134, June 7, 1954, p. 114, 117, 120.

Automatic system that turns out 7,000,000 gal. of clarified and 1,000,000 gal. of demineralized water every day. Photographs. (L17)

582-L. Special Property Nickel Plate. *Steel,* v. 134, June 21, 1954, p. 135.

Low-tensile and compressive stress characteristics, hardness and wear resistance of nickel sulfamate bath deposits. Table, graph. (L17, Q general, Ni)

583-L. The Plurial Process. M. Lebrun. *Welding and Metal Fabrication,* v. 22, June 1954, p. 228, 229-231.

Development, principles and use of bundled electrodes for hard facing. Tables, photographs, oscillogram. (L24, ST)

584-L. Mechanical Process for Porous Chromium Plates. G. S. Samoilovich and N. G. Andreev. *Henry Brutcher, Altadena, Calif., Translation no.* 3090, 5 p. (From *Vestnik Mashinostroeniya,* v. 32, no. 11, 1952, p. 49-52.)

Knurling process for impressing small but relatively deep holes into surface of engine liners to be plated. Photographs, diagrams, micrographs. (L14, G12, Cr)

585-L. Recent Methods for the Protection of Zinc and Tin. H. Anders. *Henry Brutcher, Altadena, Calif., Translation no.* 3095, 5 p. (From *Werkstoffe und Korrosion,* v. 3, no. 12, 1952, p. 460-461.)

Chemical methods of surface protection of zinc involving the production of chromate coatings. Protection of tin surfaces by anodic oxidation in dilute ammonia solutions and anodic blackening of tin and tin alloys with solutions containing phosphates or ferricyanides. 3 ref. (L14, L19, Sn, Zn)

586-L. Tinning and Soldering of Aluminum by Ultrasonics. P. Wenk and H. Boljahn. *Henry Brutcher, Altadena, Calif., Translation no.* 3231, 6 p. (Slightly condensed from *Zeitschrift für Metallkunde,* v. 43, no. 9, 1952, p. 322-324.)

Previously abstracted from original. See item 974-L, 1952. (L16, K7, Al)

587-L. (French.) **Galvanization of Tubes.** H. Bablik. *Métallurgie et la construction mécanique,* v. 86, no. 5, May 1954, p. 433, 435, 437, 439.

Installation improvements, surface preparation, fluxes and base metal. Micrographs, tables, photograph. (L16, Zn)

588-L. (French.) **Surface-Active Materials. New Resources for the Engineer.** José de Launoit and Henry Jungels. *Revue universelle des mines,* v. 10, ser. 9, no. 4, Apr. 1954, p. 92-96.

Application for pickling, corrosion inhibition and drawing compounds. (L12, R10, G21)

589-L. (German.) **Electrolytic Deposition of Silver From Solutions of Simple Salts.** H. M. Heiling. *Metall,* v. 8, nos. 11-12, June 1954, p. 438-448.

Influence of inhibition, current density, temperature, anions and silver concentration. Diagrams, micrographs, tables. 27 ref. (L17, Ag)

590-L. (Italian.) **Finishing of Light-Alloy Pistons.** A. Prati and F. Sacchi. *Alluminio,* v. 23, no. 2, Mar. 1954, p. 139-144.

Leading, tinning and graphitization. Micrographs, photographs. 8 ref. (L16, Al, Pb, Sn)

591-L. (Italian.) **Tin as a Coating Material.** G. Bianchi. *Metallurgia italiana,* v. 46, no. 4, Apr. 1954, p. 141-149.

Reactions accompanying corrosion of tin-coated iron and copper. Graph, tables. 19 ref. (L16, L17, Sn, Fe, Cu)

592-L. (Swedish.) **Electroformed Hard Nickel Alloy Molds.** P. Spiro. *Svenska Plast Föreningen Tekniska Meddelanden,* v. 9, no. 7, Apr. 1954, 13 p.

Production, properties and finishing of master molds. Diagrams. (L18, T5, Ni)

593-L. Gaps in Cathodic and Anodic Coatings on Steel. Corrosive and Protective Effects. U. R. Evans. *British Steelmaker,* v. 20, June 1954, p. 206-209.

Electrochemical phenomena at gaps when surface is wet with a corrosive liquid. Diagram. 13 ref. (L19, L21, ST)

594-L. Metallizing May Be for You. Howard Vanderpool. *Chemical Engineering,* v. 61, July 1954, p. 189-194.

Equipment and techniques for metallizing. Metallizing systems. Applications in chemical processing equipment. Photographs, diagram. (L23)

595-L. Thermostatic Control in Electroplating. Leo Walter. *Electroplating and Metal Finishing,* v. 7, June 1954, p. 212-214.

Basic factors, effect of process and control time lags, choice of equipment. (L17)

596-L. Cleaning and Conditioning Metal Surfaces for Coatings. P. C. Bardin. *Industrial Finishing,* v. 30, June 1954, p. 30 + 14 pages.

Acid solution, steam spray and manual washing, solvent vapor and thermal degreasing, blast and ultrasonic cleaning. Phosphate coatings. Photographs. (L12, L10, L14)

597-L. Engineered Finishing System Meets Difficult Requirements. P. C. Bardin. *Industrial Finishing,* v. 30, June 1954, p. 58 + 5 pages.

System for applying white enamel by flow coating on a food waste disposer. Photographs. (L27)

598-L. Molybdenum Coatings Expand Uses of Metallizing. A. P. Shepard. *Iron Age,* v. 174, July 1, 1954, p. 105-107.

Coatings provide a surface material with good wear resistance as well as a bonding coat for other metals. Photographs. (L23, Mo)

599-L. System Engineering for Continuous Strip Processing Lines. J. S. Apperson. *Iron and Steel Engineer,* v. 31, June 1954, p. 68-74; disc., p. 74-76.

Electrical system for electrolytic tinning line. Photographs, diagrams, graph. (L17, Sn)

600-L. Sputtering at Low Ion Velocities. Gottfried Wehner and Gustav Medicus. *Journal of Applied Physics,* v. 25, June 1954, p. 698-702.

Low-sputtering rates measured by probe technique in a plasma. Determination of threshold voltage. Diagram, graphs. 4 ref. (L25, Pt)

601-L. Reclaiming Overmachined Parts With Electroless Plating. Frank Charity. *Machine and Tool Blue Book,* v. 49, July 1954, p. 132-134, 136.

Baths, operating procedures, advantages and limitations. Photographs, table. (L14, Ni)

602-L. Loss of Aluminium From Galvanising Baths. N. B. Rutherford. *Metal Treatment and Drop Forging,* v. 21, June 1954, p. 261-267.

Means for reducing loss and method of calculating additions needed. Tables, graphs. 26 ref. (L16, Al, Zn)

603-L. The Aldip Process for Coating Steel With Aluminum. *Modern Metals,* v. 10, June 1954, p. 66, 68.

Produces a tight, nonrusting, heat resistant coating on iron and steel surfaces. Photographs, diagram. (L16, Al, CN)

604-L. A Survey of Metal Surface Soils and Their Removal. Edward Engel. *Organic Finishing,* v. 15, June 1954, p. 18-23.

Methods of removing cutting oils and drawing, forming, and buffing compounds. Tables. (L10)

605-L. Effect of Surface Finishing of Nonferrous Base Metals on the Protective Value of Plated Coatings. George J. Kahan, W. W. Macchia and J. M. Fairbank. *Plating,* v. 41, June 1954, p. 649-652.

Six finishing methods on rolled brass with protective finishes of bright nickel and chromium. Micrographs. (To be continued.) (L general, Cr, Cu, Ni)

606-L. Control of Radiant Heat by Surface Finish. R. M. Leedy. *Westinghouse Engineer,* v. 14, July 1954, p. 147-151.

Effect of various coatings on emissivity. Tables, graphs, photographs, diagrams. 15 ref. (L general, P17)

607-L. Porcelain Enamel Fights Corrosion. W. A. Barrows. *Power,* v. 98, July 1954, p. 111-113, 220.

Advantages of coating on boiler tubes, pump impellers, coal screws, heat exchangers, thermocouple shields, smokestacks, breechings and induced-draft fans. Photographs. (L27)

608-L. Protection of Iron and Steel by Thermally Produced Oxide Coatings ('Thermoxyd' Process). E. Fenner and L. Koch. *Henry Brutcher, Altadena, Calif., Translation no.* 3184, 9 p. (From *Archiv für Metallkunde,* v. 2, no. 2, 1948.)

Previously abstracted from original. See item 7B-99, 1949. (L14, CI, ST)

609-L. Surface Layers of High-Melting Titanium Compounds. A. Münster and W. Ruppert. *Henry Brutcher, Altadena, Calif., Translation no.* 3249, 14 p. (From *Zeitschrift für Elektrochemie,* v. 57, no. 7, 1953, p. 564-571.)

Previously abstracted from original. See item 8-L, 1954. (L25, Ti, Fe)

610-L. Role of Nickel Dip in Enameling of Sheet Steel. D. G. Moore, J. W. Pitts and W. N. Harrison. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3207, June 1954, 27 p.

Effects of firing time and weight of nickel deposited from the nickel-dip solution on the adherence developed by a cobalt-free and a cobalt-bearing ground-coat. Graphs, tables, micrographs. 19 ref. (L16, L27, Fe, CN)

611-L. Electroplated Coatings. J. M. Hosdowich. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 41-55.

Review of application and properties of chromium and nickel plate. Photographs, tables. 13 ref. (L17, Cr, Ni)

612-L. Anodized Coatings. J. M. Hosdowich. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 56-62.

Review of application and properties on aluminum, magnesium and zinc. Photograph. 7 ref. (L19, Al, Mg, Zn)

613-L. Diffusion Treatments for Wear Protection. M. B. Bever and C. F. Floe. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 120-130.

Chromizing and siliconizing. Processes, reactions and structure of cases. 21 ref. (L15, Cr, Si, ST)

614-L. Metallizing. Howard Vanderpool and A. P. Shepard. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 131-153.

Equipment and processes. Properties of coatings. Applications of metallized parts in equipment subjected to severe wear. Table, photographs. (L23)

615-L. Hard Facing. Howard S. Avery. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 163-173.

Review of methods, materials and equipment. Tables, photographs. 3 ref. (L24)

616-L. Hard Facing Alloys. Howard S. Avery. Paper from "Surface

Protection Against Wear and Corrosion". American Society for Metals, p. 174-179.

Classification and structure. Criterions for selection. Tables. (L24)

617-L. Tungsten Carbide Hard Facing. Howard S. Avery. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 180-190.

Review of materials, processes and equipment. Photographs, micrographs, graphs. 5 ref. (L24, W)

618-L. Chromium Carbide Hard Facing. Howard S. Avery. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 191-201.

Properties of austenitic and hardenable high-chromium hard-facing alloys. Micrographs, graph, tables. 8 ref. (L24, Cr)

619-L. Austenitic Stainless Steels. Howard S. Avery. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 251-261.

Hardness and corrosion resistance of stainless steel overlays. Graphs, tables. 5 ref.
(L24, Q29, R general, SS)

620-L. Austenitic Manganese Steels. Howard S. Avery. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 262-273.

Compositions and properties of alloy steels for hard facing and other overlays. Tables, photographs. 4 ref. (L24, Q general, AY)

621-L. Hard Facing for Hot Wear Resistance. T. Gaynor. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 274-289.

Review of welding methods and hard facing alloys. Photographs, tables. 9 ref. (L24)

622-L. Economic Justification of Protective Coatings. Clarence C. Harvey. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 295-304.

Appraisal of coating costs, comparison with cost of atmospheric corrosion. Graphs, tables.
(L general, R3)

623-L. Surface Preparation and Pretreatment of Metals Prior to Painting. A. J. Liebman. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 305-345.

Equipment and methods for mechanical, flame, chemical and blast cleaning. Tables, photographs, graphs, diagrams, micrographs. 16 ref. (L26, L10, L12)

624-L. Organic Coating for Normal Services. Arnold J. Eickhoff. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 346-365.

General review of corrosion theory. Performance and economics of paints. Photographs, graphs, tables. 18 ref. (L26, R general)

625-L. Corrosion Prevention by Paint Maintenance in Severe Industrial Atmospheres. Kenneth Tator. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 366-377.

Cost comparisons of painting for appearance versus corrosion protection. Graphs, photograph. 2 ref. (L26)

626-L. Metallizing. H. S. Ingham. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 427-442.

Metallized coating systems, applications and costs. Photographs. (L23)

627-L. Electrodeposited Coatings. Fielding Ogburn. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 443-452.

Review of electroplating procedures, properties of electrodeposits and commercial applications.
(L17, Q general, T general)

628-L. (English.) **The Effect of Metal Surface Condition on the Anodic Oxidation of Tantalum.** D. A. Vermilyea. *Acta Metallurgica,* v. 2, no. 3, May 1954 p. 476-481.

On polished sheet, an efficiency of 98% is obtained up to the spark voltage with no change in the character of oxide surface. With rough sheet, apparent efficiencies greater than 100% are observed above a critical voltage depending on the nature of the original metal surface. Graphs, micrographs. 2 ref. (L19, Ta)

629-L. (English.) **The Formation of Anodic Oxide Films on Tantalum in Non-Aqueous Solutions.** D. A. Vermilyea. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 482-486.

Influence of forming solution on film structure and on formation kinetics. Graphs. 1 ref. (L19, Ta)

630-L. (French.) **The Variation of Porosity of Electrolytic Coatings as a Function of Electrolysis Conditions.** René Audubert and Maurice Bonnemay. *Comptes rendus,* v. 238, no. 21, May 24, 1954, p. 2083-2084.

Deposits of chromium on copper. Tables. (L17, Cr, Cu)

631-L. (French.) **Study of Anode Voltage During Electrolytic Polishing.** Philippe Brouillet and Israel Epelboin. *Comptes rendus,* v. 238, no. 22, May 31, 1954 p. 2160-2162.

Anode and contact voltage of layer of anions on surface of metal being polished. 1 ref. (L13, Al, Ni)

632-L. (French.) **Possible Surface Treatments for Pressure Castings.** R. Grunberg. *Métallurgie et la construction mécanique,* v. 86, no. 5, May 1954, p. 395, 397, 399.

Corrosion protection for zinc and light alloys. Graph, photograph, table. (To be continued.)
(L general, Zn, Al)

633-L. (German.) **Scraping Method for Finishing of Stamped Parts in Precision Machine Industry.** E. P. Kuhlmann. *Metalloberfläche,* Ausgabe A, v. 8, no. 6, June 1954, p. 85-86.

Method suitable for sheet steel parts 0.5 to 6 mm. thick. Photographs, diagram. (L10, ST)

634-L. (German.) **Hardfacing of Compound Cast Rails.** A. Buchholz. *Schweissen und Schneiden,* v. 6, no. 6, June 1954, p. 238-240.

Composition and strength methods and metallurgical examination. Photographs, micrographs, tables. 2 ref. (L24, ST)

635-L. (German.) **The Influence of Chlorine Ions on the Mechanics of Dissolution of Nickel Anodes in Sulphate Baths.** Willi Machu and Adly Ragheb. *Werkstoffe und Korrosion,* v. 5, no. 6, June 1954, p. 217-222.

Anodic behavior of nickel in solutions of nickel sulfate. Formation of oxide layers during anodic polishing. Tables, graphs. 6 ref.
(L19, Ni)

636-L. (Russian.) **Production of Bright Nickel Coatings From Ammonical Electrolytes.** N. A. Izgaryshev, N. T. Kudriavtsev and E. V. Morozov. *Doklady Akademii Nauk SSSR,* v. 96, no. 1, May 1, 1954, p. 143-144.

Economy of process and operating conditions. 7 ref. (L17, Ni)

637-L. (Russian.) **Application of Electrolytic Polishing for Removing Layers of Metals and Alloys for Determining Diffusion Coefficients.** M. B. Neiman and A. Ia. Shiniaev. *Doklady Akademii Nauk SSSR,* v. 96, no. 2, May 11, 1954, p. 315-318.

Diffusion of iron into nickel. Graphs, diagram. 4 ref.
(L17, N1, Fe, Ni)

638-L. (Russian.) **Composition and Properties of a Complex Electrolyte of a Copper-Pyrophosphate Bath.** E. A. Ukshe and A. I. Levin. *Zhurnal Obshchei Khimii,* v. 24, no. 5, May 1954, p. 775-780.

Complex ion composition, instability constants, and relation of conductivity to concentration of components. Tables, graphs. 10 ref.
(L17, Cu)

639-L. Automatic Brushing Deburrs Turbine Disks. R. DePastina and R. E. Eyre. *American Machinist,* v. 98, July 5, 1954, p. 124-125.

Shop-made brushing machine achieves lower costs, higher production, improved surface finish and more uniform results. Photographs. (L10)

640-L. Electronic Configuration in Electrodeposition From Aqueous Solutions. I. The Effect of Ionic Structures. II. The Deposition Process. Ernest H. Lyons, Jr. *Electrochemical Society, Journal,* v. 101, July 1954, p. 363-381.

Major characteristics of electrode systems in electrodeposition explained on structural considerations. Table. 161 ref. (L17)

641-L. Depolarization Effects After Current Reversal at Silver Anodes and Cathodes. A. L. Ferguson and D. R. Turner. *Electrochemical Society, Journal,* v. 101, July 1954, p. 382-386.

Anode and cathode reactions at silver electrodes in hydrogen saturated 2*N* sulfuric acid following a current reversal. Diagrams, graphs. 19 ref. (L17, Ag)

642-L. The Zinc Coating of Paper for Capacitors by Vacuum Evaporation. L. Holland and K. Hacking. *Electronic Engineering,* v. 26, July 1954, p. 296-301.

Zinc atoms possess very low binding energies to nonmetallic surfaces and it is necessary to pre-coat the paper surface with nucleating film. Deposition techniques. Photographs, graphs. 22 ref. (L25, T1, Zn)

643-L. Cermets and Ceramic-Coated Metals Team Up With Jet Propulsion. Alexander Pechman. *Finish,* v. 11, July 1954, p. 35-37, 64.

Application and properties of cermet and ceramic coatings. Photographs. (L27, T25)

644-L. Extend Applications of Nickel Immersion Plating. A. E. Durkin. *Iron Age,* v. 174, July 8, 1954, p. 91-94.

Advantages and disadvantages of electroless process, properties of coatings. Micrograph, photograph, graphs, tables. (L16, Ni)

645-L. Chrome-Diffusion. R. H. Warring. *Machinery Lloyd (Overseas Ed.),* v. 26, June 19, 1954, p. 70-71, 73-74.

Chromizing procedures and applications. Graphs, diagrams, tables. (L15, Cr)

646-L. Kanigen Nickel Plating. Gregoire Gutzeit. *Metal Progress,* v. 66, July 1954, p. 113-120, 146.

Chemistry and process, characteristics and uses of plate deposited by electroless method. Tables, diagrams, micrograph, graph. 11 ref. (L14, Ni)

647-L. Notes on Solution of Problems in Odd Job Vapor Coating. W. L. Bond. *Optical Society of America, Journal,* v. 44, June 1954, p. 429-438.

Charts for solution of problems pertaining to vapor coating in general and coating of glass with various metals. Graphs, nomograms, diagrams. (L25)

648-L. Voltage and Current Fluctuations in the Output of Plating Rectifiers. V. L. Richards. *Plating,* v. 41, July 1954, p. 773-781.

Measurements using an oscilloscope. Effects of voltage fluctuations on current. Diagrams, graphs, tables. (L17)

649-L. Plating Applications in the Television Field. Leonard P. Fox. *Plating,* v. 41, July 1954, p. 785-788.

Unusual plating applications in the production of electron tubes. Microgarphs, photographs. (L17)

650-L. Effect of Surface Finishing of Nonferrous Base Metals on the Protective Value of Plated Coatings. George J. Kahan, W. W. Macchia and J. M. Fairbank. *Plating,* v. 41, July 1954, p. 789-792.

Method of surface finishing of rolled brass and zinc die castings had no pronounced effects on the protective value of electrodeposits. Table. 10 ref. (L14, L17, Cu, Zn)

651-L. Modern Plating Practice. Silver Plating. J. W. Round. *Product Finishing,* v. 7, June 1954, p. 58-62, 132.

Review of equipment, bath compositions, procedures. Table, photograph. 3 ref. (L17, Ag)

652-L. Productivity in the Paint Shop. E. Johnson. *Product Finishing,* v. 7, June 1954, p. 65-73.

Methods of avoiding waste, correct use of plant and equipment. Photographs. (L26)

653-L. Improving Productivity in Metal Finishing. E. E. Halls. *Product Finishing,* v. 7, June 1954, p. 74-80.

Methods of improving operating efficiency and resultant quality. Photograph. (L general)

654-L. Plastics in the Plating Shop. II. Tanks and Vessels. F. F. Jaray. *Product Finishing,* v. 7, June 1954, p. 88-92.

Properties and applications of plastics that have proved satisfactory in plating, pickling and other treatment of vessels and tanks. Photographs, table. (L26)

655-L. (Dutch.) **Surface Treatment of Metals.** *Bedrijf en Techniek,* v. 9, no. 204, June 19, 1954, p. 290-295, 298.

Anodizing of aluminum, plating, organic additives to lustrous nickel-plating baths, corrosion of nickel-cobalt deposits, automobile lacquers, auxiliary materials to resistance welding, electropolishing, corrosion through pores of coatings and electrolytic tin plating. Photographs, micrographs, diagrams. (L general, Al, Sn, Ni, Co)

656-L. (German.) **Electroplating With Tin Alloys.** J. W. Guthbertson. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 20, no. 5, May 1954, p. 148-152.

Conditions and procedure with various alloys. Graphs, photographs. (L17, Sn)

657-L. (Russian.) **Reconditioning of Rotor Blades of Turboblowers by Weld Deposits.** N. S. Bashanov. *Vestnik Mashinostroeniia,* v. 33, no. 12, Dec. 1953, p. 82-83.

Process resulted in lowering ultimate strength of the blade by welding heat. Diagrams, photograph. (L24, SS)

658-L. (Book.) **Surface Protection Against Wear and Corrosion.** 461 p. 1954. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $5.00.

Thirty papers presented during the 35th National Metal Congress and Exposition, Cleveland, Oct. 19 to 23, 1953. Covers wear testing, case hardening, hard facing, and coatings. Individual papers separately abstracted.
(L general, J28, Q9, R general)

659-L. (Book-German.) **(Practical Electrochemistry.)** Elektrochemisches Praktikum. E. Müller and H. Reuther. 9th Ed. 384 p. 1953. Theodor Steinkopf, Dresden and Leipzig.

A laboratory manual for a university electrochemistry course. Consists of series of experiments on fundamental electrochemistry as well as electrodeposition, inorganic and organic preparations, molten electrolytes, and electrothermal processes. (L17, C23, P15)

M

Metallography, Constitution and Primary Structures

248-M. The Solid Solubility of Phosphorus in Iron. H. Schrader and B. N. Bose. *Indian Institute of Metals, Transactions,* v. 6, 1952, p. 104-136.

Thermodynamic computation on reliability of gamma phase boundary and solubility lines of diagram. Graphs. 26 ref. (M24, P, Fe)

249-M. Some Micrographic Investigations by Etch Figures on Commercially Pure Aluminium. E. G. Ramachandran and N. J. Wadia. *Indian Institute of Metals, Transactions,* v. 6, 1952, p. 344-349; disc., p. 349-350.

Shape and distribution of etch pits in relation to crystallographic orientation and grain boundary structures. Micrographs, photographs, diagram. 8 ref. (M27, Al)

250-M. The Constitution of Gold-Molybdenum Alloys, With Particular Reference to the Solubility of Molybdenum in Gold. G. A. Geach and D. Summers-Smith. *Institute of Metals, Journal,* v. 82, June 1954, p. 471-474.

X-ray powder photography and lattice-parameter measurements up to 800° C. Graphs, tables. 11 ref. (M24, Au, Mo)

251-M. Methods for Determining the Liquidus Points of Titanium-Rich Alloys. W. Hume-Rothery and D. M. Poole. *Institute of Metals, Journal,* v. 82, June 1954, p. 490-492 + 1 plate.

Preparation and testing methods. Diagram, graph, micrographs. 1 ref. (M24, Ti, Ni, Cu, Sn)

252-M. Successive Orientational Transitions in Crystals. Theodore J. Krieger and Hubert M. James. *Journal of Chemical Physics,* v. 22, May 1954, p. 796-814.

Extended discussion of crystal model, consisting of an array of classical rotators with next-neighbor coupling. Graphs, tables. 20 ref. (M26)

253-M. Solution of the Schrödinger Equation in Periodic Lattices With an Application to Metallic Lithium. W. Kohn and N. Rostoker. *Physical Review,* v. 94, ser. 2, June 1, 1954, p. 1111-1120.

Variation-iteration method applied in solving a major problem in band theory of solids. Tables, graph. 15 ref. (M26, Li)

254-M. Structure of Gd, Dy, and Er at Low Temperatures. J. R. Banister, S. Legvold and F. H. Spedding. *Physical Review,* v. 94, ser. 2, June 1, 1954, p. 1140-1142.

Crystal structures of gadolinium, dysprosium and erbium metals determined over wide temperature range. Tables, graphs. 15 ref. (M26, Gd, Dy, Er)

255-M. A Pressurized High-Temperature Debye-Scherrer Camera, and Its Use to Determine the Structures and Coefficients of Expansion of Gamma and Delta Manganese. Z. S. Basinski and J. W. Christian. *Royal Society, Proceedings,* v. 223, ser. A, May 20, 1954, p. 554-560.

Structures of gamma and delta manganese found to be face-centered cubic and body-centered cubic, respectively. Mean values of linear coefficients of thermal expansion of the phases over their regions of stability, and volume changes resulting from transformations. Diagram, graphs. 5 ref. (M22, P11, Mn)

256-M. Survey of Portions of the Chromium - Cobalt - Nickel - Molybdenum Quaternary System at 1,200° C. Sheldon Paul Rideout and Paul A. Beck. *U. S. National Advisory Committee for Aeronautics, Report* 1122, 1953, 38 p.

Determination of boundaries of face-centered cubic (alpha) solid solutions and of phases co-existing with alpha. Tables, graphs, micrographs. 24 ref. (M24, Cr, Co, Ni, Mo)

257-M. (French.) **Particular Aspects of Study of Thin Metal Sections.** Raymond Castaing and Paul Laborie. *Comptes rendus,* v. 238, no. 19, May 10, 1954, p. 1885-1887.

Importance of preliminary treatment of metal for electron diffraction studies. Micrographs. 1 ref. (M22, Al, Cu)

258-M. (French.) **Effect of Distortion of Lattice on Diffusion of X-Rays by Solid Solutions.** André Guinier. *Comptes rendus,* v. 238, no. 19, May 10, 1954, p. 1898-1900.

Calculation of diffusion caused by alloy having atoms of different diameters. Aluminum-copper alloys studied. (M22, Al, Cu)

259-M. (German.) **Electrolytic Polishing of Metals. Fundamentals and Applications of Electrolytic Polishing in Science and Technology.** P. A. Jacquet. *Metall,* v. 8, nos. 11-12, June 1954, p. 449-458.

Concept of surface quality. Electropolished surfaces show true structure of the metal. Micrographs, graphs, tables, photographs. 69 ref. (M21, L13)

260-M. Electron Micrographs of Crystal Boundary and Sub-Boundary Structures in Steels and Ingot Irons. E. W. Williams and H. O'Neill. *Iron and Steel Institute, Journal,* v. 177, June 1954, p. 224-228 + 5 plates.

Aging effects in rimming steel; structural features of Armco iron; intergranular features in a nickel-chromium-molybdenum steel. Tables, micrographs, phase diagram. 26 ref. (M21, M27, CN, AY, Fe-a)

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Resolution of two-step replicas becomes better by using zirconium, silicon, germanium and chromium in place of aluminum on methyl methacrylate - aluminum replicas. Micrographs, diagram, table. 12 ref. (M21, Al, Zr, Si, Ge, Cr)

262-M. Electron Diffraction. Uses and Limitations in the Study of Metals. J. W. Menter. *Metal Treatment and Drop Forging,* v. 21, June 1954, p. 289-294.

Determination of lattice and crystal structure and microgeometry of surfaces. 37 ref. (M22, M26)

263-M. Crystal Structure of the Intermetallic Compound $Mg_3Cr_2Al_{18}$. Sten Samson. *Nature* v. 173, June 19, 1954, p. 1185-1186.

X-ray diffraction data. Table. 3 ref. (M26, Al, Cr, Mg)

264-M. Anisotropy of Distortions of Crystal Lattice of Martensite. V. A. Il'ina, V. K. Kritskaya and G. V. Kurdyumov. *Henry Brutcher, Altadena, Calif., Translation no.* 3080, 6 p. (From *Doklady Akademii Nauk SSSR,* v. 85, no. 5, 1952, p. 997-999.)

Study of true cause of weakening of intensity of certain doublet lines on X-ray photographs of martensite, random static deviations of iron atoms from ideal position in direction of tetragonal axis versus increase in amplitude of thermal vibrations in this direction. Table. 4 ref. (M26, M22, ST)

265-M. Structure and Properties of Nitrogen-Bearing Chromium Metal and Ferrochromium. M. L. Korolev. *Henry Brutcher, Altadena, Calif., Translation no.* 3264, 13 p. (From *Izvestiya Akademii Nauk SSSR, OTN,* 1953, no. 10, Oct., p. 1465-1470.)

Previously abstracted from original. See item 46-M, 1954. (M27, Q general)

266-M. Investigations Into the Ternary System Aluminum-Iron-Zinc. E. Gebhardt. *Henry Brutcher, Altadena, Calif., Translation no.* 3269, 17 p. (From *Zeitschrift für Metallkunde,* v. 44, no. 5, 1953, p. 206-211.)

Previously abstracted from original. See item 230-M, 1953. (M24, Al, Fe, Zn)

267-M. A Metallographic Study of Equilibrium Relationships in 3S Aluminum Alloy. Philip R. Sperry. Paper presented at Pacific Northwest Metals and Minerals Conference of the A.I.M.E., 1954, Portland, Ore. 13 p.

23 ref. (M24, Al)

268-M. X-Ray Diffraction in the Identification of Aluminum Alloys. F. R. Morral. Paper presented at Pacific Northwest Metals and Minerals Conference of the A.I.M.E., 1954, Portland, Ore. 10 p.

Includes tables. 39 ref. (M22, Al)

269-M. (English.) **Ternary Metallic Phases in the Ta-C-N, Ta-C-O and Ta-N-O Systems.** Nils Schönberg. *Acta Chemica Scandinavica,* v. 8, no. 4, 1954, p. 620-623.

Structures and compositions. Diagrams. 4 ref. (M26, Ta)

270-M. (English.) **The Composition of the Phases in the Vanadium-Carbon System.** Nils Schönberg. *Acta Chemica Scandinavica,* v. 8, no. 4, 1954, p. 624-626.

X-ray diffraction and microscopical studies of sintered mixtures. Diagram. 6 ref. (M26, M22, V)

271-M. (English.) **The Structure of the Metallic Quarternary Phase ZrTaNO.** Nils Schönberg. *Acta Chemica Scandinavica,* v. 8, no. 4, 1954, p. 627-629.

Some sections of the quaternary zirconium-tantalum-nitrogen-oxygen system investigated by X-ray methods to find whether metallic ternary and quaternary phases exist. Table. 3 ref. (M26, Zr, Ta)

272-M. (English.) **The Climb of Edge Dislocations in Face-Centered Cubic Crystals.** R. S. Barnes. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 380-385.

Dislocation properties under conditions of heating or cooling, deformation, particle bombardment and interdiffusion. Diagrams. 9 ref. (M26)

273-M. (English.) **The Tungsten Carbide and Nickel Arsenide Structures.** Nils Schönberg. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 427-432.

Studies on four ternary nitrides of the tungsten carbide structure, and two new sulfides of nickel arsenide structure. Niobium sulfide phase of nickel arsenide type is stable with an excess of sulfur, but transforms to the tungsten carbide type at low sulfur content. Tables, graphs. 20 ref. (M26, W, Ni)

274-M. (English.) **Interstitial Content of Radiation-Damaged Metals From Precision X-Ray Lattice Parameter Measurements. I. Principles of the Measurements.** Charles W. Tucker, Jr., and John B. Sampson. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 433-438; disc., p. 554.

Theory based on elasticity interpretation which predicts Vegard's law and several other experimentally confirmed X-ray effects. 22 ref. (M26)

275-M. (French.) **Modifications in Aluminum-Copper Alloys on Heating in Vacuum.** N. Takahashi and J. J. Trillat. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 409-415.

Electron diffraction studies of different film structures. Diagrams, table, micrograph, oscillograms. 8 ref. (M22, Al, Cu)

276-M. (German.) **Growth and Crystallographic Orientation of Dendrites.** J. Schlipf and A. Seeger. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 546-547.

Crystallographic characteristics of six different structures. Conditions for growth in form of formula. Graphs, table. 4 ref. (M26, N12)

277-M. (German.) **The Nitrides, Carbides, Borides, and Silicides of the Transition Metals.** Roland Kiessling. *Fortschritte der chemischen Forschung,* v. 3, no. 1, 1954, p. 41-69.

Combinations of nonmetals and transition metals and their interstitual structures. Tables, graph, diagram. 128 ref. (M26)

278-M. (German.) **The Use of Counters for Determination of Textures.** Wolfgang Bunk, Kurt Lücke and Georg Masing. *Zeitschrift für Metallkunde,* v. 45, no. 5, May 1954, p. 269-275.

Comparison of photographic and Geiger counter methods for metal textures. Photographs, graphs, table, diagrams. 11 ref. (M23, Q24, Al)

279-M. (German.) **The Position of Twinning Planes in Hexagonal CdS Crystals.** Karl-Heinz Jost. *Zeitschrift für Naturforschung,* v. 9a, no. 5, May 1954, p. 435-436 + 1 plate.

Orientation of crystallographic axis, modification and position of twinning planes determined by X-ray photographs. Diagrams, photograph. (M26)

280-M. (Polish.) **Theory of Dislocation and Properties of Metals.** W. Tomaszczyk. *Prace Instytutow Ministerstwa Hutnictwa,* v. 6, no. 2, 1954, p. 98-104.

Fundamental features of dislocation theory. Interpretation of reoccurring of yield point after strain aging, blue brittleness, recovery and recrystallization phenomena. Graphs, diagrams. 10 ref. (M26, N5, Q23)

281-M. The Microstructures of Various Grades of Titanium and Their Rates of Formation. W. D. Bennett. *Canadian Journal of Technology,* v. 32, July 1954, p. 167-173 + 2 plates.

Typical microstructures of various grades of pure and impure titanium. Effects of purity and mechanical and thermal treatments on their rates of formation. Micrographs, table. 5 ref. (M27, Ti)

282-M. Study of Exogenous Inclusions in Bottom Poured Acid Steel. N. R. Krishnaswamy. *Indian Institute of Metals, Transactions,* v. 5, 1951, p. 77-93; disc., p. 93-94.

Analysis of chemical composition and microstructures. Inclusions were separated electrolytically. Photographs, micrographs, graphs, table. 9 ref. (M27, M28, ST)

283-M. Equilibrium Relations in the Iron-Nitrogen System. V. G. Paranjpe and Morris Cohen. *Indian Institute of Metals, Transactions,* v. 5, 1951, p. 173-185; disc., p. 186.

Existing data on the thermodynamics of iron-nitrogen phases combined with results of a recent determination of the iron-nitrogen phase diagram to compute the effect of pressure on this system. Graphs, table. 21 ref. (M24, Fe)

284-M. Cathodic Vacuum Etching. T. R. Padden and F. M. Cain, Jr. *Metal Progress,* v. 66, July 1954, p. 108-112, 162, 164.

New design of equipment using zirconium fittings and cooled cathode reduces etching time to one to three minutes in standardized routine and handles difficult compacts and couples as easily as the common metals and alloys. Diagram, micrographs. 9 ref. (M21)

285-M. Effect of Grain Size on the Crystal Structure of Cobalt. E. A. Owen and D. Madoc Jones. *Physical Society, Proceedings,* v. 67, no. 414B, June 1954, p. 456-466.

Lattice parameter of cobalt composed of different grain sizes as found in fine dust, filings and annealed solid rod. Tables, graph. 12 ref. (M26, Co)

286-M. (Russian.) **Methods of Studying Structures of Metals and Alloys at High Temperatures.** I. A. Oding and M. G. Lozinskii. *Vestnik Machinostroeniia,* v. 34, no. 1, Jan. 1954, p. 52-61 + 2 plates.

High-temperature vacuum metallography and methods of investigation. Diagrams, photographs, graphs, micrographs. 21 ref. (M23)

287-M. (Book.) **The Microscopy of Metals.** 132 p. 1954. The Institute of Metallurgists, 28 Victoria St., London, S.W. 1. 15s. 6d.

Microscopes and techniques; general metallography; use of polarized light in metallography; hot stage microscopy; and phase-contrast and interference metallography. (M21, M23)

288-M. (Book.) **Phase Diagrams of the Titanium-Aluminum, Titanium-Chromium-Iron, and Titanium-Oxygen Alloy Systems.** 94 p. 1952. Wright Air Development Center, U. S. Dept. of Commerce, PB 111327, Office of Technical Services, Washington 25, D. C. $2.00.

Summarizes work at Armour Research Foundation on partial phase diagrams, and methods of obtaining them. (M24, Ti, Al, Cr, Fe)

289-M. (Book.) **Relation of Properties to Microstructure.** 270 p. 1954. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $4.00.

A seminar held during the 35th National Metal Congress and Exposition, Cleveland, Oct. 17 to 23, 1953, sponsored by the American Society for Metals. Papers individually abstracted. (M27, Q general)

290-M. (Book—French.) **(Metallic Materials. Pt. I. Generalities, Methods of Structure Examination of Metals and Alloys, Physical Methods for Study of Transformations.) Les Matériaux Métalliques. I. Généralités-Métodes d'Examen de la Structure des Metaux et Alliages - Methodes Physiques d'Etude des Transformations.** R. Bensimon. 103 p. 1953. Editions Eyrolles, 61 Boulevard Saint Germain, Paris. 780 fr.

Crystallographic notations, alloy structure equilibrium diagrams; investigation methods; thermal analysis. (M general)

291-M. (Book—German.) **(Electrolytic Polishing.) Electrolytisches Polieren.** H. Benninghoff. 146 p. 1953. Eugen C. Leutze Verlag, Saulgau/Wttbg. D.M. 17.50.

Processes for polishing metallographic specimens. (M21)

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Transformations and Resulting Structures

235-N. A Note on the Use of Indium for Removal of Mercury Vapor in Vacuum Systems. R. D. Heyding and E. A. Flood. *Canadian Journal of Chemistry,* v. 32, June 1954, p. 591-592.

Indium adsorbs mercury vapor quite rapidly after a short induction period. Table. (N15, In)

236-N. The Isothermal Heat Treatment of High Speed Steels and Its Effects in the Light of Recent Structure Research. H. Schrader and D. R. Dhanbhoora. *Indian Institute of Metals, Transactions,* v. 6, 1952, p. 54-93; disc., p. 94-95.

Possible alterations in composition and dependence on alloy and carbon content of steel, annealing period in pearlitic range and in holding time in bainitic range and resulting influences. Tables, graphs, diagrams, micrograph. 27 ref. (N8, J26, TS)

237-N. Impurities as Hindrances to Grain Boundary Migration. V. G. Paranjpe. *Indian Institute of Metals, Transactions,* v. 6, 1952, p. 203-218.

Detailed mechanisms and supporting evidence applicable to commercial heat treating processes involving recrystallization and grain growth. Photographs, diagrams, graph, table. 28 ref. (N3, N5, J general)

238-N. The Structure of Eutectics. V. Chandrasekhar. *Indian Institute of Metals, Transactions,* v. 6, 1952, p. 243-266.

Critical review of existing knowledge on genesis of eutectic structures, influence of supercooling, proeutectic constituent, rate of cooling and liquid currents. Tables, micrographs, graph. 25 ref. (N12)

239-N. Studies on the Grain Growth of Alpha Brass. S. C. Som and G. P. Chatterjee. *Indian Institute of Metals, Transactions,* v. 6, 1952, p. 267-271; disc., p. 271-273.

Some fundamental concepts on growth as a function of time and temperature under a known temperature-gradient condition. Graphs. 5 ref. (N3, Cu)

240-N. Isothermal Transformations of Hypo-Eutectoid Aluminium Bronzes. R. Haynes. *Insitute of Metals, Journal,* v. 82, June 1954, p. 493-496 + 1 plate.

Effect of small additions of nickel to a binary hypo-eutectoid alloy. Table, graphs, micrographs. 12 ref. (N9, Al, Cu)

241-N. Solid Solubility of Oxygen in Columbium. A. U. Seybolt. *Journal of Metals,* v. 6, June 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, June 1954, p. 744-776.

Solubility limit in range between 775 and 1100° C. by lattice parameter measurements and microscopic examination. Solubility varied from 0.25 to 1.0%. Tables, graphs, micrographs. (N12, Cb)

242-N. Vibrational Spectrum of the Simplest Model of an Ordering Alloy. A. N. Men and A. N. Orlov. *National Science Foundation Translation, no.* 160, Jan. 1954, 4 p. (From *Doklady Akademii Nauk SSSR,* v. 90, 1953, p. 753-756.)

Linear chain of two types of atoms distributed over nodes of the chain with an arbitrary degree of long-range order and with arbitrary relative concentration which interact elastically. 5 ref. (N10, Au, Cu)

243-N. The Diffusion of Nitrogen in Alpha Iron. W. R. Thomas and G. M. Leak. *Philosophical Magazine,* v. 45, 7th ser., no. 365, June 1954, p. 656-659.

Measurements of diffusion in temperature range of 0 to 100° C. Graphs, table. 6 ref. (N1, Fe)

244-N. Nucleation and Growth of Graphite in Steel. Floyd Brown. *Welding Journal,* v. 33, June 1954, p. 257S-261S.

Reaction rates and effects of alloying elements. Tables, diagram, graphs, micrographs. 9 ref. (N2, N3, ST)

245-N. Transformation of Austenite During Continuous Cooling. A. A. Popov. *Henry Brutcher, Altadena, Calif., Translation no.* 3089, 31 p. (Part translation from book by I. N. Bogachev and A. A. Popov, Entitled "Phase Transformations in Iron-Carbon Alloys", Mashgiz, 1950, p. 136-159.)

Austenite decomposition diagrams for continuous cooling at various rates, applying to hypo-eutectic and hypereutectic carbon steels and to alloy steels differing in the stability of the supercooled austenite, especially at second-stage temperatures. Tables, graphs. 3 ref. (N8, CN, AY)

246-N. Effect of Surface-Active Compounds Upon the Diffusion of Hydrogen Into Iron and the Mechanism of Hydrogen Overvoltage. I. A. Bagotskaya and A. N. Frumkin. *Henry Brutcher, Altadena, Calif., Translation no.* 3253, 7 p. (From *Doklady Akademii Nauk SSSR,* v. 92, no. 5, 1953, p. 979-982.)

Transfer of hydrogen overvoltage through a membrane of spectrographically pure iron, with simultaneous measurement of the quantity of hydrogen diffusing through it during cathodic polarization in pure 1*N* HCl solutions and in the presence of an inhibitor. Graphs, diagram. (N1, Fe)

247-N. On the Nature of Eutectic Graphite in Gray Iron. K. P. Bunin and L. A. Dolinskaya. *Henry Brutcher, Altadena, Calif., Translation no.* 3131, 8 p. (From *Liteinoe Proizvodstvo,* v. 4, no. 3, 1953, p. 21-23.)

Mechanism of crystallization of fine "eutectic" graphite. Photographs, micrographs. 3 ref. (N12, CI)

248-N. Principles of Solution Hardening. Earl R. Parker and Thomas H. Hazlett. Paper from "Relation of Properties to Microstructure", American Society for Metals, p. 30-70.

Mechanisms of hardening, contribution of clustering, factors influencing solution hardening. Graphs, diagrams. 44 ref. (N7, J27)

249-N. Theories of Dispersion Hardening. Edward W. Hart. Paper from "Relation of Properties to Microstructure". American Society for Metals, p. 95-107.

Comparison of theories with experience. Diagrams, graphs. 11 ref. (N7, J27)

250-N. Interactions of Dislocations and Solute Atoms. A. H. Cottrell. Paper from "Relation of Properties to Microstructure". American Society for Metals, p. 131-162.

Types of interactions and their effects. Tables, graphs, diagrams, micrograph. 75 ref. (N12, M26)

251-N. (English.) **Transformation Mechanism of Low Chromium Steel With High Carbon at the Range of Ar″ Transformation Temperature.** Kenji Ono and Tadashi Nemoto. *Hitachie Review,* 1954, no. 5, Feb., p. 31-38.

Transformation processes of chromium and chromium-molybdenum steels investigated by means of magnetic analysis. Tables, diagram, graphs. 4 ref. (N8, AY)

252-N. (French.) **New Example of Discontinuous Precipitation on Grain Boundaries of Aluminum-Manganese Alloys.** André Robillard and Paul Lacombe. *Comptes rendus,* v. 238, no. 18, May 3, 1954, p. 1814-1816.

Mechanism of "light phenomenon" of tempered supersaturated solid solutions. Micrographs. (N7, Al, Mn)

253-N. (French.) **Evolution of the Structure of 80-20 Nickel-Chromium Alloys Susceptible to Structural Hardening, Studied Under X-Rays.** Jack Manenc. *Comptes rendus,* v. 238, no. 18, May 13, 1954, p. 1817-1819.

X-ray crystal analysis reveals a homogeneity disturbance of solid solution prior to precipitation visible under the electron microscope. Radiogram. 7 ref. (N7, M22, Ni)

254-N. (French.) **Grain Growth Observed by Electron-Emission Microscope.** G. W. Rathenau and G. Bass. *Métaux, Corrosion-Industries,* v. 29, no. 344, Apr. 1954, p. 139-150.

Recrystallization of nickel and iron alloys during transformation. Micrographs, diagram, graph. 16 ref. (N3, N5, M22, Ni, Fe)

255-N. (French.) **Research on Formation of Large Heterogeneous Crystals in Light Alloys Containing Chromium.** Jean Chinetti. *Métaux, Corrosion-Industries,* v. 29, no. 344, Apr. 1954, p. 151-166.

Solubility limit of chromium in aluminum-chromium-manganese alloys at 662° C. Tables, micrographs, diagram, graphs. 8 ref. (N12, Al, Cr, Mn)

256-N. (French.) **The Metallography of Stressed and Unstressed Pure Zinc at Elevated Temperatures.** P. J. E. Forsyth. *Revue de métallurgie,* v. 51, no. 5, May 1954, p. 326-336.

Grain growth, grain-boundary formation and recrystallization. Micrographs, diagrams, photographs. 3 ref. (N3, N5, M27, Zn)

257-N. (German.) **Determination of Some Diffusion Coefficients of Metals in Quicksilver Using the Mercury Drop-Electrode.** M. v. Stackelberg and V. Toome. *Zeitschrift für Elektrochemie,* v. 58, no. 4, 1954, p. 226-230.

Diffusion coefficients of cadmium, indium, lead and sodium in mercury at 22° C. Tables, graphs. 14 ref. (N1, Co, In, Pb, Hg)

258-N. (Polish.) **Relation Between Curves of Isothermal Austenite Transformation and Temperature of Austenite Transformation During Continuous Cooling.** Marian Kozlowski. *Hutnik,* v. 21, no. 3, Mar. 1954, p. 66-72.

Comparison of calculation with experimental results. Advantages derived from knowledge of course of curves. Graphs. 3 ref. (N8, AY)

259-N. Modification of High-Silicon Aluminium Alloys and the Corresponding Structures. Claude Mascré. *Institute of British Foundrymen, Proceedings,* v. 46, 1953, p. A227-A232; disc., p. A232-A235. (Translated from the French by V. C. Faulkner.)

Action of phosphorus and sodium on grain refinement and resulting mechanical properties. Photomicrographs, graphs, diagrams, table. 6 ref. (N5, Q general, Al, Si)

260-N. Annealing of White Irons. Structural Changes With Metals of High S:Mn Ratios. Axel Hultgren and Gustaf Ostberg. *Iron & Steel (Special Issue)*, v. 27, June 12, 1954, p. 272-282; disc., p. 327-332.

Effect of annealing variables and S:Mn ratio on type of graphite structure of cementite and austenite, and transformation of manganese sulfide. Tables, graphs, micrographs. (N8, J23, CI)

261-N. Cementite in Cast Iron. Decomposition During Solidification. A. Berman and V. Kondic. *Iron & Steel (Special Issue)*, v. 27, June 12, 1954, p. 283-284; disc., p. 327-332.

Graphitization at different cooling rates. Decomposition of cementite at temperatures below the eutectic. Graphs, tables, micrograph. (N8, CI)

262-N. The Growth of Nodular Graphite. Theory of Screw Dislocation. M. Hillert and Y. Lindblom. *Iron & Steel (Special Issue)*, v. 27, June 12, 1954, p. 295-296; disc., p. 327-332.

Theory examined by activation analysis and autoradiography using radioactive isotopes in mischmetal. Photograph, diagram, table. (N8, M23, CI)

263-N. Undercooled Graphite. Formation in Cast Irons and Related Alloys. H. Morrogh and W. J. Williams. *Iron & Steel (Special Issue)*, v. 27, June 12, 1954, p. 302-304; disc., p: 327-332.

Undercooled graphite in cast irons, iron-carbon-silicon alloys and iron-carbon alloys arises from the decomposition of a carbide. Micrographs, tables. (N8, CI, Fe)

264-N. Solidification of Fe-P-C Alloys. H. Morrogh and P. H. Tütsch. *Iron & Steel (Special Issue)*, v. 27, June 12, 1954, p. 304-305; disc., p. 327-332.

Additions of phosphorus to iron-carbon alloys profoundly modified the usual ledeburitic structures. Table, diagram, micrographs. (N12, CI)

265-N. The Solidification of Nodular Iron. H. Morrogh. *Iron & Steel (Special Issue)*, v. 27, June 12, 1954, p. 310-313; disc., p. 327-332.

Cooling curve experiments. Tables, micrographs. (N12, CI)

266-N. Diffusion of Nitrogen in Iron. J. D. Fast and M. B. Verrijp. *Iron & Steel (Special Issue)*, v. 27, June 12, 1954, p. 313-314.

Diffusion coefficients at 9.5, 21.5, 500, 600 and 950° C. Graphs, tables. (N1, Fe)

267-N. Transformation Diagrams. Continuous-Cooling Curves of Steels. W. Steven and G. Mayer. *Iron & Steel (Special Issue)*, v. 27, June 12, 1954, p. 317-321.

Progress with temperature of the transformations that occur in bars up to 6 in. diameter when quenched in oil under standard conditions. Graphs, table. (N8, CN)

268-N. The Strain Ageing of Mild Steel. A Critical Investigation of the Ageing of Mild-Steel Strip After Temper-Rolling. B. Jones and R. A. Owen-Barnett. *Iron and Steel Institute, Journal*, v. 177, June 1954, p. 209-220.

Aging of steels at room temperature for periods up to 3 yr. compared with artificial aging at temperatures of 100 to 250° C. Tables, graphs. 20 ref. (N7, J27, CN)

269-N. Order-Disorder Phenomena. Bruno Linder. *Journal of Chemical Physics*, v. 22, June 1954, p. 970-973.

Thermodynamics of the order-disorder transition in beta brass. Graph. 9 ref. (N10, Cu)

270-N. Isothermal Transformation of Austenite in the Pearlite Range From the Carburizing Temperature. H. M. Meingast. *Henry Brutcher, Altadena, Calif., Translation no.* 2862, 5 p. (Condensed from *Durferrit Hausmitteilungen*, 1952, no. 25, p. 5-44.)

Particulars on two heat treatment stages which arise during case carburizing, transformation of core and case structures of steel cooled in pearlite range from carburizing temperature and martempering of case carburizing steels. Graphs, diagrams. (N8, AY)

271-N. Transformations During the Tempering of Steel. V. G. Permyakov. *Henry Brutcher, Altadena, Calif., Translation no.* 3084, 22 p. (Part from Book "Phase Transformations in Iron-Carbon Alloys", I. N. Bogachev and A. A. Popov, p. 160-174, 1950. Mashgiz, Moscow, USSR.)

Amounts of carbon precipitated per unit time from martensite during heating of quenched high, medium and low-carbon steels. Effect of alloy content of steel on carbide formation during tempering. Graphs. 5 ref. (N8, J29, CN, AY)

272-N. On the Structure of the Austenite-Graphite Eutectic in Gray Iron. K. P. Bunin, Ya. N. Malinochka and S. A. Fedorova. *Henry Brutcher, Altadena, Calif., Translation no.* 3199, 3 p. (From *Liteinoe Proizvodstvo*, v. 4, no. 9, 1953, p. 25.)

Grains of fine austenite-graphite eutectic, which formed under conditions of marked supercooling of the melt, may consist of an austenitic matrix intergrown with a single strongly branched-out graphite inclusion that grows from a single center during eutectic decomposition. Micrographs. 6 ref. (N8, CI)

273-N. Structure of Austenite at High Temperature. I. A. Oding and M. G. Lozinskii. *Henry Brutcher, Altadena, Calif., Translation no.* 3274, 18 p. (From *Izvestiya Akademii Nauk SSSR, OTN*, 1953, no. 7, July, p. 1035-1043.)

Previously abstracted from original. See item 29-N, 1954. (N8, ST)

274-N. Aluminum and Gas. I-IV. H. Kostron. *Henry Brutcher, Altadena, Calif., Translation nos.* 3276-3279, 84 p. (From *Zeitschrift für Metallkunde*, v. 43, no. 8, 1952, p. 269-284, 373-387.)

Previously abstracted from original. See item 304-N, 1952. (N12, N1, Al)

275-N. Heats of Disintegration in the Diffusion of Boron Into Tungsten and Molybdenum Metal. G. V. Samsonov. *Henry Brutcher, Altadena, Calif., Translation no.* 3285, 5 p. (From *Doklady Akademii Nauk SSSR*, v. 93, no. 5, 1953, p. 859-861.)

Previously abstracted from original. See item 193-N, 1954. (N1, P12, W, Mo, B)

276-N. State of Martensite Crystals in Quenched Low-Carbon Steels. G. V. Kurdyumov, M. D. Perkas and A. E. Shamov. *Henry Brutcher, Altadena, Calif., Translation no.* 3295, 7 p. Also *National Science Foundation Translation, no.* 224, Feb., 1954, 4 p. (From *Doklady Akademii Nauk SSSR*, v. 92, no. 5, 1953, p. 955-957.)

Previously abstracted from original. See item 120-N, 1954. (N8, CN)

277-N. Effect of Silicon on the Rate of Diffusion of Carbon in Austenite. M. A. Krishtal. *National Science Foundation Translation, no.* 223, Feb. 1954, 3 p. (From *Doklady Akademii Nauk SSSR*, v. 92, 1953, p. 951-953.)

Previously abstracted from original. See item 119-N, 1954. (N1, N8, Si, AY)

278-N. (English.) **Precipitation Out of Dual Solid Solutions of Carbon and Nitrogen in Alpha-Iron.** C. Wert. *Acta Metallurgica*, v. 2, no. 3, May 1954, p. 361-367.

Kinetics of dual precipitation studied by internal friction. Interaction tends to produce equal aging rates. Particle size effect makes magnetic data hard to interpret. Graphs. 15 ref. (N7, Q22, Fe)

279-N. (English.) **Accelerated Growth of Tin Whiskers.** R. M. Fisher, L. S. Darken and K. G. Carroll. *Acta Metallurgica*, v. 2, no. 3, May 1954, p. 368-373.

Growth rate may be accelerated up to 10,000 times the previously observed spontaneous rate by the application of pressure up to 7500 psi. Photographs, graphs. 8 ref. (N12, Sn)

280-N. (English.) **On the Theory of Secondary Recrystallization Texture Formation in Face-Centered Cubic Metals.** C. G. Dunn. *Acta Metallurgica*, v. 2, no. 3, May 1954, p. 386-393.

An oriented-nucleation growth-selectivity theory. Diagrams, tables. 25 ref. (N5, Cu, Al)

281-N. (English.) **Secondary Recrystallization in Aluminium Extrusions.** K. V. Gow. *Acta Metallurgica*, v. 2, no. 3, May 1954, p. 394-405.

Crystallographic orientations of recrystallized grains in a series of extruded and heat treated rods of commercial and superpure aluminum. Tables, micrographs, diagrams. 19 ref. (N5, Al)

282-N. (English.) **The Effect of Relative Crystal and Boundary Orientations on Grain Boundary Diffusion Rates.** D. Turnbull and R. E. Hoffman. *Acta Metallurgica*, v. 2, no. 3, May 1954, p. 419-426.

Rate of self-diffusion of silver in the grain boundaries of bicrystals. Graphs, photographs, tables. 16 ref. (N1, Ag)

283-N. (English.) **Activity of Silicon in Liquid Fe-Si and Fe-C-Si Alloys.** J. Chipman, J. C. Fulton, N. Gokcen and G. R. Caskey, Jr. *Acta Metallurgica*, v. 2, no. 3, May 1954, p. 439-450.

Experimental data establishing solubility of graphite at temperatures of 1290 to 1690° C. in iron-silicon-carbon solutions up to 20 to 24 wt. % silicon. Tables, graphs. 28 ref. (N12, P12, Si, Fe)

284-N. (English.) **The Ordering of Atoms in the Chi-Phase of the Iron-Chromium-Molybdenum System.** J. S. Kasper. *Acta Metallurgica*, v. 2, no. 3, May 1954, p. 456-461.

Crystal structure investigated by X-ray and neutron diffraction from powdered specimens. Tables, diagram. 3 ref. (N10, Fe, Cr, Mo)

285-N. (English.) **Some Observations on Heterogeneous Nucleation of Sodium Crystals From Atomic Beams.** L. Yang, C. E. Birchenall, G. M. Pound and M. T. Simnad. *Acta Metallurgica*, v. 2, no. 3, May 1954, p. 462-469.

Deposition from sodium vapor beams studied as function of temperature and lattice misfit between the body-centered cubic sodium crystal and the various crystalline substrates. Tables, graphs. 22 ref. (N2, Na)

286-N. (English.) **A Radioactive Tracer Study of Silver Condensation on Substrates.** Ling Yang, M. T. Simnad and G. M. Pound. *Acta Metallurgica*, v. 2, no. 3, May 1954, p. 470-475.

Condensation coefficients of silver vapor on substrates of silver, gold, platinum, nickel and glass at 192° C. with time of condensation fixed at 1 hr. Diagram, graphs, tables. 10 ref. (N16, Ag)

287-N. (English.) **The Effect of Phase Transformations on the Orientation of Zirconium Crystals.** J. W. Glen and

S. F. Pugh. *Acta Metallurgica*, v. 2, no. 3, May 1954, p. 520-529.

Orientation relations suggested by Burgers for the phase change in zirconium used to deduce possible orientations which can arise after one or two transformations starting from either a hexagonal or a body-centered-cubic lattice. Diagrams, tables. 11 ref. (N6, M26, Zr)

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289-N. (French.) **Influence of Impurities on Secondary Recrystallization of Soft Iron.** Roger Guihaumé. *Comptes rendus*, v. 238, no. 21, May 24, 1954, p. 2085-2086.

Role of impurities during grain growth of Armco and Ugiperval iron. 6 ref. (N5, N3, Fe)

290-N. (French.) **The Simultaneous Observation of Polygonization and Recrystallization During Annealing of the Surface Layers of Abraded Alpha Brass.** Pierre A. Jacquet. *Comptes rendus*, v. 238, no. 22, May 31, 1954, p. 2165-2167.

Observation of phenomena during grinding. Micrographs. 5 ref. (N5, Q24, Cu)

291-N. (French.) **Effect of Cold Hardening After Tempering on the Phenomena of Pre-Precipitation in Aluminum-Copper Alloy With 4% Copper.** René Graf and André Guinier. *Comptes rendus*, v. 238, no. 22, May 31, 1954, p. 2175-2177.

X-ray study on development of Guinier-Preston zones and precipitation. Table. 5 ref. (N7, Al, Cu)

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Effect of surface tension on graphite crystallization. Graphs, diagrams. 36 ref. (N8, CI)

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Probability of various structures depending on specific volumes of two pure substances and concentrations of both kinds of crystals. Tables, micrographs, graphs. 30 ref. (N12)

294-N. (Russian.) **Effect of Austenite Grain Size Upon Martensite Transformation in Steel.** M. G. Gaidukov and V. D. Sadovskii. *Doklady Akademii Nauk SSSR*, v. 96, no. 1, May 1, 1954, p. 67-68 + 1 plate.

Breaking down of austenite grains caused by formation of slippage planes during deformation should show an effect similar to lowering of temperature. Table, micrographs. 7 ref. (N8, ST)

295-N. (Russian.) **Solubility of Chemical Elements in Titanium.** I. I. Kornilov. *Izvestiia Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk*, 1954, no. 3, May-June, p. 392-399.

Effects of atomic diameters on formation of solid solutions. Tables, graphs. 38 ref. (N12, Ti)

296-N. (Russian.) **Investigation of Structural Changes in Iron-Nickel-Aluminum Alloys by Method of True Heat Capacity.** V. A. Troshkina and K. G. Khomiakov. *Zhurnal Obshchei Khimii*, v. 24, no. 5, May 1954, p. 780-790.

Causes of high coersive state and structural changes arising in process of magnetic hardening. Graphs, tables, diagram. 12 ref. (N6, M23, Fe, Ni, Al)

297-N. Transformations in Steels—Isothermal and During Continuous Cooling. G. P. Contractor and V. G. Paranjpe. *Indian Institute of Metals, Transactions*, v. 5, 1951, p. 141-144; disc., p. 144-145.

Method of correlating isothermal and continuous cooling transformations. Qualitative results can be deduced by this method but it does not give good quanitative agreement in all steels. 5 ref. (N8, ST)

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Critical review of existing knowledge. Attention drawn to some aspects of this reaction not yet well understood. Graphs, micrographs. 61 ref. (N8, ST)

299-N. Interaction of Hydrogen With White Cast Iron. P. C. Ghosh and B. Chatterjee. *Indian Institute of Metals, Transactions*, v. 5, 1951, p. 215-224; disc., p. 224-225.

Mechanism of interaction between hydrogen and alloys of iron, carbon, sulphur and phosphorus. Graph, diagram, tables. 20 ref. (N1, CI)

300-N. Theories of Graphite Formation in Nodular Cast Irons. M. N. Parthasarathi, B. S. Srikantiah and B. R. Nijhawan. *Indian Institute of Metals, Transactions*, v. 5, 1951, p. 227-242; disc., p. 243.

Literature review. Theories to explain nodular-graphite formation in irons treated with magnesium, cerium etc. Micrographs, diagram. 31 ref. (N8, CI)

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Formation and extent of sigma phase in ferritic and austenitic stainless steels. Micrographs, phase diagrams. (N6, M26, SS)

302-N. Formation of Graphite Nodules. Albert De Sy. *Metal Progress*, v. 66, July 1954, p. 92-93.

Mechanism of solidification of nodular iron. Diagrams, micrograph. (N12, CI)

303-N. Diffusion of Impurities in Germanium. W. C. Dunlap, Jr. *Physical Review*, v. 94, sr. 2, June 15, 1954, p. 1531-1540.

Diffusion of impurities in semiconductors studied by observation of *p-n* junction formed as the diffusing impurity penetrates the specimen. Graphs, diagrams. 10 ref. (N1, Ge)

304-N. (French.) **Micrographic Structure of Steel and Brittleness Due to Hydrogen.** Paul Bastien and Pierre Amiot. *Comptes rendus*, v. 238, no. 23, June 9, 1954, p. 2238-2239.

Hydrogen was introduced into chromium-molybdenum steel by electrolysis so that quantity of gas diffused was nearly the same in all cases. Effects of hydrogen on mechanical properties. Table. 2 ref. (N1, Q general, AY)

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Review of various theories. (N7)

306-N. (Russian.) **Solubility of Oxygen in Fusions of Iron, Chromium and Nickel.** S. V. Bezobrazov and A. M. Samarin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 12, Dec., p. 190-196.

Equilibrium between water vapor-hydrogen atmosphere and molten chromium-nickel alloys. Nature of oxide formed. Tables, graphs. 3 ref. (N12, Fe, Ni, Cr)

307-N. (Russian.) **The Nature of Laminar Graphite.** D. P. Ivanov. *Liteinoe Proizvodstvo*, 1954, no. 3, May-June, p. 18-24.

Structure, amount and nature of graphite distribution in basic metallic mass. Theories of graphitization. Micrographs. (N8, CI)

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Experimental study shows graphite forms in pores existing in the initial white iron. Micrographs. (N8, CI)

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Physical Properties and Test Methods

356-P. Modern Ideas About Properties of Metals. W. E. Boas. *Australasian Engineer*, 1954, Apr., p. 57-61.

Theory of electrical resistivity and plastic deformation. Graph, diagrams. 5 ref. (P15, Q24)

357-P. The Lattice Component of the Thermal Conductivity of Metals and Alloys. P. G. Klemens. *Australian Journal of Physics*, v. 7, Mar. 1954, p. 57-63.

Magnitude of lattice conductivity is related to electronic thermal conductivity at low temperatures. Graphs, table. 16 ref. (P11)

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Relative permeability of several alloys of manganese with phosphorus and arsenic measured in the region of the Curie point. Graphs, table. 20 ref. (P16, Mn, As)

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Poisson's ratio, shear and bulk moduli, modulus of resilience, proportional limit and yield strength. Graphs. 5 ref. (P10, Q27, Q28, U)

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A comparison method for determining values of absorption coefficient *k* of a metal relative to previously determined values for silver. Reflectivities measured at an angle of incidence of 45°, in the wavelength range of 0.40 to 0.95 micron at glass-metal and air-metal interfaces. Graphs, tables, diagrams. 37 ref. (P17, Al, Ag, Au, Cu)

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Energy of interface between small particles of alkali metal and an alkali halide lattice. Table, graphs. 16 ref. (P10, K, Na)

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Explanation of variation of Curie temperature with composition. Graph. 8 ref. (P16, Pd, Pt, Ni, Co)

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Probability of their being formed will depend on energy involved. Energy calculated. Diagrams. 11 ref. (P12, M26)

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Basic ferromagnetic concepts, coercive force of particles of subcritical size and the contribution to coercive force by finely dispersed precipitates. Micrograph, diagrams, graphs. 11 ref. (P16, M27, SG-n)

377-P. Structure and Coercivity. J. F. Libsch and G. P. Conard. Paper from "Relation of Properties to Microstructure". American Society for Metals, p. 233-259.

Effects of porosity, inclusions, composition and orientation on coercivity. Graphs, micrograph. 65 ref. (P16, M27, SG-n)

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Effect of magnetization and stress on attenuation. Table, graphs, diagrams. 12 ref. (P10, P16)

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382-P. (French.) **Determination of Ionization Current of Copper in Electrolysis by the Method of Radioactive Tracers.** René Audubert. *Comptes rendus,* v. 238, no. 20, May 17, 1954, p. 1997-1999.

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Investigation at 475 to 670° C. for calcium and 400 to 600° C. for strontium. Diagrams, graph, table. 6 ref. (P12, Ca, Sr)

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Results of investigation on steel and steel alloys. Tables, chart. 8 ref. (P10, ST)

386-P. (Russian.) **The Thermodynamic Properties of Binary Metallic Systems by Electromotive Force Method: Cadmium-Bismuth System.** A. V. Nikol'skaia and Ia. I. Gerasimov. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 4, Apr. 1954, p. 713-728.

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Magnetic and general physical properties and characteristics of numerous materials. Photographs, table, graph. (To be continued.) (P16, SG-n)

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Effect of various emissivities on heating rate illustrated by series of calculated time-temperature curves. Table, graphs. (To be continued.) (P11, Al)

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Thermo-electric power, resistivity, specific heat conductivity and temperature difference between hot and cold junctions determine efficiency of thermocouple materials. Values for Chromel P-constantan, bismuth alloys and ZnSb. Tables, graphs, photographs, diagrams. 60 ref. (P15, S16, Cr, Bi, Sb, Fe, Cu)

392-P. Frequency Spectrum and Specific Heat of a Face-Centered Cubic Lattice. I. II. Low Temperature Region. Carl W. Garland and George Jura. *Journal of Chemical Physics,* v. 22, June 1954, p. 1108-1117.

Born-von Karman treatment for a face-centered cubic lattice using techniques developed by Montroll. Numerical data for silver. Diagram, tables, graphs. 14 ref. (P12, M26, Ag)

393-P. Shorting and Field Corrections in Hall Measurements. W. F. Flanagan, P. A. Flinn and B. L. Averbach. *Review of Scientific Instruments,* v. 25, June 1954, p. 593-595.

Method for correcting measured Hall voltage for shorting by current contacts and for inhomogeneities in applied magnetic field. Method applied to measurements of Hall coefficient in gold-silver alloys. Diagram, graphs. 4 ref. (P15, Ag, Au)

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396-P. (English.) **The Effect of Hydrogen on Ultrasonic Attenuation and Velocity Measurements in Titanium.** C. F. Ying and R. Truell. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 374-379.

Values changed by large amounts when metal was heated in hydrogen at temperatures near 550° C. Attenuation decreased with increasing hydrogen content. Table, graphs, micrographs. 8 ref. (P10, Ti)

397-P. (English.) **Effect of Cold Work on the Magnetic Susceptibility of Copper and Aluminum.** J. D. McClelland. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 406-408.

Susceptibilities measured as function of cold work. Graph, table. 8 ref. (P16, Cu, Al)

398-P. (English.) **Studies in Magnetochemistry. X. The Non-Radical Nature of the Barium Salts of Alloxantin, Tetramethyl-Alloxantin and Hydrindantin. XI. The Magnetic Properties of the Elements Niobium, Tantalum and Rhenium.** R. W. Asmussen and H. Soling. *Acta Chemica Scandinavica,* v. 8, no. 4, 1954, p. 558-568.

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Molybdenum oxide with the probable ideal formula Mo_3O prepared by reaction between molybdenum powder and MoO_2 at a comparatively low temperature. Table. 4 ref. (P13, Mo)

400-P. (English.) **Solubility of Nitrogen in Alpha-Iron.** Hans U. Åström and G. Borelius. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 547-549.

Measurements in range of 570 to 170° C. by mechanical relaxation phenomenon and isothermal calorimetry. Graphs. 2 ref. (P13, Fe)

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Investigations show evidence of continuous spectrum rather than single activation energy associated with radiation energy. Graphs. 4 ref. (P13, Cu, Au)

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Experiments compared with published data. Tables, diagram. 13 ref. (P12, Cs)

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Effects of metallurgical and structural factors. Manufacture of pure iron and iron alloyed with silicon, aluminum, nickel and cobalt. Tables, graphs, diagrams. 95 ref. (P16, Fe, SG-p)

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Thin copper foils, cooled to liquid nitrogen temperature, were subjected to bombardment by 12-m.e.v. deuterons. Stored energy released due to annealing of radiation damage was measured as foils warmed to room temperature. Diagram, graphs. 11 ref. (P10, Cu)

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Remanence, coercive force and field strength of ferroxydure. Graph. (P16, SG-p)

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Thermal dissociation, specific heat and phase transformations in range 450 to 1100° C. Tables, graphs. 14 ref. (P11, P12, N6, Cu, Se)

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Method used in determining surface tension, influence of metallic and nonmetallic inclusions, relation between surface tension and mechanical properties and flowability. Tables, graphs, diagrams. 2 ref. (P10, Q general, Cr, Ni)

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Free and impeded shrinkage formulas and shrinkage impedence force. Graphs. 2 ref. (P10, CI)

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Approximation procedure which only requires that slope in the corresponding linear problem be expandable in either a Fourier-Bessel or Dini series depending on nature of boundary conditions involved. Tables. (Q25)

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Static method of determining strain energy function for general deformation. 11 ref. (Q21)

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Metallographic and X-ray studies on effect of cold deformation. Micrographs, radiograms, table. 21 ref. (Q24, M27, SS)

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Effect of prestrain and other characteristics on 17-Cr, 18-8 and 18-11 Cr-Ni, stainless steels and SAE 1020 carbon steel. Tables, graphs. 22 ref. (Q27, F28, SS, CN)

616-Q. Studies on the Relation Between Some Static and Dynamic Properties of Carbon Steels Under Different Thermal Treatments. S. Chatterjee and G. P. Chatterjee. *Indian Institute of Metals, Transactions,* v. 6, 1952, p. 193-201; disc., p. 201-202.

Nature of relation between area under stress-strain curve, toughness and Izod values. Tables, graphs. (Q27, Q6, CN)

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Concept of hardness in terms of work done per unit volume of indentation. Compares values with Brinell hardness numbers. Graphs. 4 ref. (Q29)

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Effects of anodic passivation at

high current density in dilute sulfuric acid and subsequent aging on hardness values. Graphs, tables. (Q29, R10, CN)

619-Q. Metallographic Observations on Cell Formation and Development in Aluminium. J. W. Kelly and R. C. Gifkins. *Institute of Metals, Journal,* v. 82, June 1954, p. 475-480 + 4 plates.

Cell formation from kink and deformation bands in many grains, at various rates at temperatures up to 300° C. Micrographs, tables. 38 ref. (Q24, M27, Al)

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Micro-beam X-ray diffraction technique for determining orientation relationships between neighboring units of substructure. Causes and mechanism of cell development. Diagrams, micrographs, tables. 35 ref. (Q24, M22, Zn)

621-Q. How Heat Treating Improves Modern High Strength Irons. C. R. Austin. *Iron Age,* v. 173, June 10, 1954, p. 125-129.

Variation of properties with different heat treatments. Tables, graphs, photograph. (Q general, J general, CI)

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Fundamental equations formed with temperature distribution across tube wall and variations of modulus of elasticity and coefficient of thermal expansion obtained from experimental data. Graphs. 7 ref. (Q21, P11)

623-Q. Plastic Flow in a Rectangularly Notched Bar Subjected to Tension. E. H. Lee. *Journal of Applied Mechanics,* v. 21, June 1954, p. 140-146.

Initial motion based on undeformed boundaries and subsequent flow including deformation of notch boundaries. Diagrams. 16 ref. (Q24, Q27)

624-Q. Comparison of the Hardening Produced in a Yield-Point Steel by Uniaxial Loading Under Static and Under Dynamic Conditions. D. H. Harris and M. P. White. *Journal of Applied Mechanics,* v. 21, June 1954, p. 194-195.

Plastic straining under longitudinal impact causes more severe working and greater hardening in annealed mild steel than does an equal static strain. 2 ref. (Q28)

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Microstructural stability after 34,000 hr. exposure at 900 and 1050° F. Tensile and creep rupture properties before and after 10,000 hr. exposure. Diagrams, tables, micrographs. 7 ref. (Q3, Q4, CN, AY)

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Photo-elasticity, strain gages, brittle lacquers and analogies. Photographs, diagrams. 4 ref. (Q25)

627-Q. On the Effect of Change in Deformation Rate on Plastic Deformation. L. I. Vasilyev, A. S. Bylina and M. P. Zagrebennikova. *National Science Foundation Translation, no.* 138, Dec. 1953, 3 p. (From *Doklady Akademii Nauk SSSR,* v. 90, 1953, p. 767-769.)

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628-Q. The Role of Grain Boundaries in the Plastic Deformation of Aluminum. E. S. Yakovleva and M. V. Yakutovich. *National Science Foundation Translation, no.* 155, Jan. 1954, 4 p. (From *Doklady Akademii Nauk SSSR,* v. 90, 1953, p. 1027-1029.)

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Phenomena of practical importance in work hardening, aging of alloys and variations of electrical resistance. Micrographs, graphs. 24 ref. (Q24, P15, M26, N7)

630-Q. The Markings in the Cleavage Surfaces of Zinc Single Crystals. A. Deruyttere and G. B. Greenough. *Philosophical Magazine,* v. 45, 7th ser., no. 365, June 1954, p. 624-630.

Crystals of various orientations broken by applied tensile stresses at −196° C. Two faces of the cleavage fracture differed markedly. Diagrams. 7 ref. (Q26, Zn)

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Theory applied in detail to twinning and certain other features of the deformation associated with cleavage fracture of zinc single crystals. Charts. 12 ref. (Q24, Q26, Zn)

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Types, design information, applications of methods for material and simulated service testing. Tables, photographs. (Q7)

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Reference data sheet on alloys which are unmachinable or intricately shaped. Tables. 7 ref. (Q23, Fe, Mo, W, Mn, Ti, V, Cb, Al)

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Electronic instrument developed for measurement of internal friction to high level of accuracy. Diagrams. 6 ref. (Q22)

635-Q. Effects of Residual Stress on Fatigue Life of Metals. R. L. Mattson. *Steel Processing,* v. 40, June 1954, p. 365-375, 390.

Common causes of internal stresses, measurement and consequences of their existence. Graphs, tables, diagram, micrographs. 10 ref. (Q25, Q7)

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Mechanical properties at temperatures to 800° C. under different pressures. Photographs, graphs, tables, micrographs. 16 ref. (Q23, Cr)

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Method for determination of principal stresses at any point of a body subjected to arbitrary loads. Diagrams, photographs, stress patterns, graphs, tables. 19 ref. (Q25)

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Compares predictions of theories for buckling of long flat plates with results of elastic and plastic buckling tests on long square tubes. Graphs, photograph, table. 14 ref. (Q28, Q1, Al)

639-Q. Statistical Study of Overstressing in Steel. G. E. Dieter, G. T. Horne and R. F. Mehl. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3211, Apr. 1954, 34 p.

Effect of microstructure on susceptibility to reduction in fatigue life due to cycles of overstress. Graphs, micrographs, tables. 29 ref. (Q7, M27, ST)

640-Q. Fatigue as a Factor in Pressure Vessel Design. T. J. Dolan. *Welding Journal,* v. 33, June 1954, p. 265S-275S.

Factors influencing fatigue strength of metal members from viewpoint of applicability to design of pressure vessels. Photograph, diagrams, graphs. 48 ref. (Q7)

641-Q. Fatigue Tests of Steel Specimens Prepared for Metallizing. R. C. Miller, Jr., and A. W. Brunot. *Welding Journal,* v. 33, June 1954, p. 275S-279S.

Laboratory tests show extent to which preparation for metallizing lowers fatigue strength of steel shafts. Tables, diagrams, photographs. (Q7, L23, ST)

642-Q. The Effect of Grain Boundaries on Mechanical Properties. M. Gensamer. Paper from "Relation of Properties to Microstructure". American Society for Metals, p. 16-29.

Crystallographic translation predominates at low temperatures and high speeds of deformation, whereas grain boundary shear predominates at elevated temperatures and slow speeds. Impurities play a large role in determining the effectiveness of grain boundaries in limiting ductility. Graphs, photographs. 27 ref. (Q23, M27)

643-Q. Effect of Dispersions on Mechanical Properties. John E. Dorn and C. Dean Starr. Paper from "Relation of Properties to Microstructure". American Society for Metals, p. 71-94.

Deformation processes occurring in alloys composed of several ductile phases viewed as simple extension of processes that occur in single-phase polycrystalline aggregates. Graphs, table. 33 ref. (Q24, M27)

644-Q. Structure and Alloy Design. A. D. Schwope. Paper from "Relation of Properties to Microstructure". American Society for Metals, p. 108-130.

Effects of alloying and subsequent structure on strength. Deformation mechanisms. Strength of solid solutions. Tables, graphs. 33 ref. (Q23, Q24, M27)

645-Q. The Relation of Microstructure to Brittle Fracture. J. R. Low, Jr. Paper from "Relation of Properties to Microstructure". American Society for Metals, p. 163-179.

Modes of brittle fracture, origin of flaws, crack propagation and intercrystalline cleavage fracture. Mi-

crographs, graphs. 19 ref. (Q26, M27, CN)

646-Q. (English.) **Stress and Deflection Measurements on a Multicell Cantilever Box Beam With 30° Sweep.** Sigge Eggwertz and Bryan R. Noton. *Aeronautical Research Institute of Sweden, Report no.* 53, 1954, 30 p.

Stress distributions in model and deflections of outer-most spars determined for two symmetrical loading cases. Graphs, diagrams, photographs, tables. (Q25, Al)

647-Q. (English.) **Calculation of Stresses in a Swept Multicell Cantilever Box Beam With Ribs Perpendicular to the Spars and Comparison With Test Results.** Sigge Eggwertz. *Aeronautical Research Institute of Sweden, Report no.* 54, 1954, 43 p.

Calculated stresses compared to test results from a glued aluminum alloy model wing. Longitudinal normal stress distribution agrees very well with experimental values, while there is a certain discrepancy for the shear stresses. Tables, diagrams, graphs. 18 ref. (Q25, Al)

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Tests in direct stress machines to avoid stress gradient across sections of specimens due to bending. Tables, graphs, diagrams, photographs. 4 ref. (Q7, ST)

649-Q. (French.) **Atomic Theory of Crystalline Elasticity Excluding Central Forces.** Jean Laval. *Comptes rendus,* v. 238, no. 18, May 3, 1954, p. 1773-1775.

Stresses developed on reticular planes by linear deformation. 3 ref. (Q21)

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Three bronze alloys tested. Diagram, photographs, micrographs, tables. 26 ref. (Q general, Cu, Sn, Pb, Zn)

651-Q. (French.) **Titanium and Vanadium in Cast Iron.** *Fonderie,* 1954, Apr., no. 99, p. 3910-3913.

Influence on corrosion resistance and mechanical properties. Table. 8 ref. (Q general, R general, CI)

652-Q. (French.) **Research on Silicon in Tin Bronzes.** *Fonderie,* 1954, Apr., no. 99, p. 3915-3917.

Effect of introduction of poorly cleaned foundry scrap on mechanical properties. Tables. (Q general, E general, Cu)

653-Q. (French.) **Standard for Preparation of A-U4 NT.** *Fonderie,* 1954, May, no. 100, p. 3952-3955.

Mechanical properties of aluminum-copper-nickel-magnesium alloy. Tables. (Q general, Al, Cu)

654-Q. (French.) **Shock Fatigue of a Steel Part: Calculation of a Bloom-Shear Stop.** L. Gascuel. *Métallurgie et la construction mécanique,* v. 86, no. 5, May 1954, p. 415-417.

Practical method of evaluating shock reactions. Diagrams, photograph. (Q6, ST)

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Effects on hardenability and other mechanical properties. Tables, graphs, diagram. 6 ref. (Q general, J26, AY)

656-Q. (Russian.) **Influence of Decomposition of Supersaturated Solid Solution Induced by Plastic Deformation on Mechanical Properties of Aluminum-Copper Alloy.** V. A. Pavlov. *Doklady Akademii Nauk SSSR,* v. 95, no. 6, Apr. 21, 1954, p. 1201-1203.

Temperature dependence of mechanical properties of pure aluminum and aluminum-copper alloy. Graphs. 13 ref. (Q general, Al)

657-Q. (Russian.) **Carrying Capacity and Strength Calculations for Parts Under Static and Variable Stresses.** S. V. Serensen. *Vestnik Mashinostroeniia,* v. 34, no. 4, Apr. 1954, p. 3-10.

Hypothesis for forged structural steel. Table, graphs. 10 ref. (Q25, ST)

658-Q. (Russian.) **Strength of Metals and Effect of Stress Concentration in Bending With Torsion in Conditions of Nonsymmetrical Cycles of Alternating Load.** G. V. Uzhik. *Vestnik Mashinostroeniia,* v. 34, no. 4, Apr. 1954, p. 11-14.

Formula for fatigue limit. Tables, graphs, photographs. 4 ref. (Q7)

659-Q. (Russian.) **Effect of Nitriding on Erosion Properties of Low Alloyed Steel Used for Steam Power Equipment Parts.** A. D. Moiseev. *Vestnik Mashinostroeniia,* v. 34, no. 4, Apr. 1954, p. 61-65.

Negative results on three types of steel alloys. Tables, graphs, micrographs. 2 ref. (Q9, J28, AY)

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Molecular hydrogen of high pressure included in cracks initiates fracturing and explains phenomenon. Graphs. 21 ref. (Q23, Q26, ST)

661-Q. Flexure-Torsion Failure of Panels. John H. Argyris. *Aircraft Engineering,* v. 26, June 1954, p. 174-184.

Investigates single skin panels. Instability mainly involves bending and torsion of the stringer. Tables, diagrams, graphs. 9 ref. (To be continued.) (Q1, Q5)

662-Q. Vanadium and Molybdenum in Medium Manganese Cast Steel. Charles C. Spencer. *American Foundryman,* v. 26, July 1954, p. 45-47.

Comparison of properties of medium manganese, manganese-vanadium and manganese-molybdenum cast steels. Manganese-vanadium steels containing 0.10% vanadium were equivalent to the manganese-molybdenum steels containing 0.30% molybdenum with regard to mechanical properties and hardenability. Micrographs, graphs, tables, photograph. (Q general, J26, CI)

663-Q. Brittle Fracture of a Crane Hook. *British Engine, Boiler & Electrical Insurance Co. Ltd., Technical Report,* New ser., v. I, Nov. 1952, p. 130-138.

Failure attributed to strain-age embrittlement. Photographs, diagrams, micrographs. (Q23, Q26)

664-Q. Some Sources of Error in Quasi-Static and Impact Notched-Bar Testing. G. A. Cottrell. *British Engine, Boiler & Electrical Insurance Co. Ltd., Technical Report,* New ser., v. I, Nov. 1952, p. 182-212.

Analysis of specimens, procedures and equipment. Photographs, graphs, diagrams. Tables. 20 ref. (Q6)

665-Q. Testing Machine for Large Structures. Application of Static and Dynamic Loads. *Engineering,* v. 177, June 11, 1954, p. 750-753.

Description of Belgian universal testing machine. Photographs, diagrams. (Q27)

666-Q. Temperature Stresses in Iron Work Rolls. Charles F. Peck, Jr., Juan M. Bonetti and Frederic T. Mavis. *Iron and Steel Engineer,* v. 31, June 1954, p. 45-57; disc., p. 57-58.

Analysis based on computed temperature distribution shows stresses which play an important part in explanation of spall faliures. Diagrams, graphs, tables. (Q25, F23, CI)

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Degree of work hardening in the cylinder wall decreased nonuniformly with an increase in distance from the surface in contact with the explosive. Graphs, diagram, micrographs. 7 ref. (Q29, ST)

668-Q. On the Rotation of Grid Lines Produced by the Formation of Plastic Bands in Tension Tests. T. Y. Thomas. *National Academy of Sciences of the United States of America, Proceedings,* v. 40, June 1954, p. 401-407.

Mathematical treatment of local deformation. Diagrams, table. 3 ref. (Q27)

669-Q. Resistance of Metals to Plastic Deformation. Yu. I. Yagn and I. A. Chaplinsky. *National Science Foundation Translation, no.* 176, Jan. 1954, 4 p. (From *Doklady Akademii Nauk SSSR,* v. 90, 1953, p. 1023-1026.)

Previously abstracted from original. See item 118-Q, 1954. (Q24, Fe, Cn, AY, Al)

670-Q. Effect of the Ratio of Rubbing Surface to Hardness on Slipping Conditions of Machine Parts in Contact. D. N. Garkunov and I. V. Kragelsky. *National Science Foundation Translation, no.* 178, Jan. 1954, 4 p. (From *Doklady Akademii Nauk SSSR,* v. 91, 1953, p. 1085-1088.)

Previously abstracted from original. See item 94-Q, 1954. (Q9, Al, Cu, ST, CN)

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Constant stresses at infinity in an elastic plate containing an elliptic inclusion of different material induce consant stresses in the elliptic inclusion. Diagrams. 3 ref. (Q25, Q21)

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By use of ceramic bonding, properly designed strain gages may be operated at temperatures up to 2000° F. Photographs, diagram, table, graphs. 3 ref. (Q25)

673-Q. The Estimation of Fatigue Damage in Aircraft Wing Structures. A. H. Chilver. *Royal Aeronautical Society, Journal,* v. 58, June 1954, p. 396-402.

Endurance of typical structural components when subjected to alternating wing loads encountered by aircraft in flight. Graphs, tables. 8 ref. (Q7)

674-Q. Recent Developments in the Structural Approach to Aeroelastic Problems. D. Williams. *Royal Aeronautical Society, Journal,* v. 58, June 1954, p. 403-421; disc., p. 421-428.

Application of electronic computer to stress analysis of aircraft. Equations suitable for mechanical computation. Graphs. 11 ref. (Q25)

675-Q. X-Ray Diffraction Takes a Fresh Look at Yield Point in Metals. Norman P. Goss. *Steel,* v. 135, July 5, 1954, p. 78-79.

Produces a clear picture of deformation mechanics. Photographs, diagrams. 2 ref. (Q23, M22, Cu, Be)

676-Q. Time-Temperature Parameters and an Application to Rupture and Creep of Aluminum Alloys. George J. Heimerl. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3195, June 1954, 35 p.

Parameter for predicting long-time life from short-time creep and rupture data for aluminum and its alloys. Graphs, table. 15 ref. (Q4, Q3, Al)

677-Q. Behavior of Steels Exposed to Hydrogen Under High Pressure. (Part I of "Constructional Materials for High-Pressure Syntheses".) O. van Rossum. *Henry Brutcher, Altadena, Calif., Translation no.* 3254, 10 p. (Part from *Chemie-Ingenieur-Technik,* v. 25, nos. 8-9, 1953, p. 481-484.)

Changes caused by exposure of low-alloy heat treating steels for 2000 to 3000 hr. at 700 atmospheres pressure and temperatures up to 1040° F. Graph, photograph, micrographs. (Q general, AY)

678-Q. Poisson's Ratio of Aircraft Sheet Materials for Large Strains. Stanley Goodman and Stanton B. Russell. Paper from "The First Midwestern Conference on Solid Mechanics, Proceedings". University of Illinois, Engineering Experiment Station, p. 1-4.

Data for three aluminum alloys, one magnesium alloy, commercially pure titanium and one titanium alloy. Graphs, 5 ref. (Q21, Al, Ti)

679-Q. The Propagation of Pulses in Cylindrical Bars—an Experimental Study. E. A. Ripperger. Paper from "The First Midwestern Conference on Solid Mechanics, Proceedings". University of Illinois, Engineering Experiment Station, p. 29-39.

Techniques and experimental data on velocity of elastic waves in drill rod. Diagrams, tables. 16 ref. (Q21, TS)

680-Q. Curvilinear Co-Ordinates for the Numerical Solution of a Notched Bar in Tension. E. D'Appolonia. Paper from "The First Midwestern Conference on Solid Mechanics, Proceedings". University of Illinois, Engineering Experiment Station, p. 60-65.

Theoretical development. Graphs, tables. 5 ref. (Q27)

681-Q. Some Problems Connected With Propagation of Stresses Above Yield Stress in a Material Exhibiting a Strain-Rate Effect. R. J. Rubin. Paper from "The First Midwestern Conference on Solid Mechanics, Proceedings". University of Illinois, Engineering Experiment Station, p. 133-135.

Equations for pulse velocity in a semi-infinite rod. 9 ref. (Q27)

682-Q. A Geometrical Construction for Plastic Flow With Work Hardening. E. H. Lee. Paper from "The First Midwestern Conference on Solid Mechanics, Proceedings". University of Illinois, Engineering Experiment Station, p. 136-140.

Theoretical development. Graphs. 8 ref. (Q24)

683-Q. On the Time Lag of Plastic Deformation. C. Riparbelli. Paper from "The First Midwestern Conference on Solid Mechanics, Proceedings". University of Illinois, Engineering Experiment Station, p. 148-157.

Relations between stress, strain and velocity in copper bar subjected to longitudinal impact. Graphs, oscillograms, diagrams. 10 ref. (Q24, Q6, Cu)

684-Q. An Experimental Investigation of the Creep Properties of Aluminum at Elevated Temperatures. R. L. Carlson and A. D. Schwope. Paper from "The First Midwestern Conference on Solid Mechanics, Proceedings". University of Illinois, Engineering Experiment Station, p. 180-183.

Behavior of 24S-T4 aluminum columns of four slenderness ratios. Graphs, photograph. (Q3, Al)

685-Q. Behavior of Perfect Columns at Elevated Temperatures. R. L. Carlson. Paper from "The First Midwestern Conference on Solid Mechanics, Proceedings". University of Illinois, Engineering Experiment Station, p. 184-185.

A straight axially loaded column will become unstable under loads less than the tangent modulus only if creep or metallurgical change effects the static stress-strain properties. Graphs. 2 ref. (Q28)

686-Q. Stresses in Columns With Time Dependent Elasticity. T. H. Lin. Paper from "The First Midwestern Conference on Solid Mechanics, Proceedings". University of Illinois, Engineering Experiment Station, p. 196-199.

Calculation of stresses and deflections. Results compared with experimental data. Graphs, diagram. 9 ref. (Q28)

687-Q. Testing for Wear Resistance. Howard S. Avery. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 4-9.

Criteria of good wear tests, statistical evaluation of data, properties affecting wear resistance. Graph. 3 ref. (Q9)

688-Q. Selecting Materials for Wear Resistance. Howard S. Avery. Paper from "Surface Protection Against Wear and Corrosion". American Soicety for Metals, p. 10-40.

Factors influencing wear including heat, impact, corrosion, vibration and fatigue and materials selection based on wear analysis. Tables, graphs, photographs, diagrams. 16 ref. (Q9)

689-Q. Martensitic Irons. Howard S. Avery. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 202-214.

Propertis and structure of wear resistant alloy cast irons. Photograph, micrographs, graphs, table. 5 ref. (Q9, M27, CI)

690-Q. Cobalt-Base Alloys. Howard S. Avery. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 215-224.

Mechanical properties of stellite-type hard-facing alloys. Tables, graphs, micrographs. 5 ref. (Q9, L24, Co)

691-Q. Nickel-Base Alloys. Howard S. Avery. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 225-230.

Composition and properties of alloys suitable for hard facing materials. Graph, tables. 6 ref. (Q9, L24, Ni)

692-Q. Martensitic and Pearlitic Steels. Howard S. Avery. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 231-250.

Abrasion resistance and hardness of steels for hard-facing applications. Methods for producing martensitic structure. 17 ref. (Q9, Q29, L24, CN, AY, SS, TS)

693-Q. Developments Necessary for General Theories of Creep Useful in Stress Analysis. K. R. Merckx. Paper presented at Pacific Northwest Metals and Minerals Conference of the A.I.M.E., 1954, Portland, Ore. 14 p. + 2 plates.

Includes graphs. 14 ref. (Q25, Q3)

694-Q. (English.) **The Slip Process During Yield-Point Deformation.** Edward W. Hart. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 416-418.

Effect of changed yield stress on production of a slip burst. Graphs. 4 ref. (Q27)

695-Q. (English.) **Residual Lattice Strains in Plastically Deformed Aluminium.** Catherine M. Bateman. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 451-455.

Residual lattice strains in three types of aluminum using X-ray diffraction methods; compared quantitatively with the theory of an intergranular stress system. Tables, graphs. 8 ref. (Q24, M22, Al)

696-Q. (English.) **Some Observations on the Anelastic Properties of Copper and Tin Bronzes.** K. J. Marsh. *Acta Metallurgica,* v. 2, no. 3, May 1954, p. 530-545.

Damping curves obtained at two frequencies, and peak damping, peak temperature and activation energy compared with results of impact-tensile tests on the same materials. Diagram, graphs, tables. 5 ref. (Q22, Q6, Q8, Cu, Sn)

697-Q. (English.) **On a New Capacitance-Type Strain Meter.** Ken Ikeda and Bunji Tomita. *Institute of Industrial Science, Report, (University of Tokyo),* v. 3, no. 7, Mar. 1954, p. 249-267.

Development of strain gages and electrical system, calibration and factors affecting accuracy. Photographs, diagrams, graphs. 8 ref. (Q25)

698-Q. (Dutch.) **Copper and Copper Alloys. XIII.** (Brass.) W. G. D. De Jager. *Metalen,* v. 9, no. 9, May 15, 1954, p. 145-146.

Tensile and fatigue strength with different treatment of various zinc and copper mixtures. Tables. (To be continued) (Q23, Q7, Cu, Zn)

699-Q. (French.) **The Polygonization of Pure Iron.** Jean Talbot, Christian de Beaulieu and Georges Chaudron. *Comptes rendus,* v. 238, no. 22, May 31, 1954, p. 2162-2165.

Structural effects of recovery after slight deformation. Micrographs, radiographs. 3 ref. (Q24, Fe)

700-Q. (French.) **Adaptation and Plastic Stabilization Tests on Rolled Structural Beams.** Charles Massonnet. *Ossature métallique,* v. 19, no. 6, June 1954, p. 318-328.

Equalization phenomena in plastic deformation for increased load limits of steel. Diagrams, photographs, tables, graphs. 6 ref. (Q24, ST)

701-Q. (German.) **Effect of Size and Hardening Temperature on Hardness and Toughness of Case-Hardened Steels.** Heinz Kiessler and Ernst Kunze. *Stahl und Eisen,* v. 74, no. 12, June 3, 1954, p. 768-772.

Frequency curves of hardness tests on manganese-chromium and chromium-nickel steels. Graphs, tables. 3 ref. (Q29, Mn, Cr, Ni, SS)

702-Q. (German.) **After Effect Theory of Elastic Relaxation.** J. Meixner. *Zeitschrift für angewandte Physik,* v. 6, no. 5, May 1954, p. 215-217.

Stress-strain relation in isotropic medium may be transformed into hydrostatic and shear components. Corresponding transformation may be made for crystals. 7 ref. (Q21)

703-Q. (Italian.) **Increasing Elastic Limit of Steels in Construction of Fuel Pipes From Tubes With Reinforced Rings and Superstressed Tubes.**

M. G. Ferrand. *Industria Mecanica*, v. 6, no. 3, Mar. 1954, p. 119-131.

Construction principles, mechanical properties. Tables, diagrams, graphs. (Q21, ST)

704-Q. (Polish.) **Tests on the Effect of Technological Process Upon the Mechanical Properties of Znal 41 Strips.** S. Socha. *Prace Instytutow Ministerstwa Hutnictwa*, v. 6, no. 2, 1954, p. 74-82.

Strip from semi-continuous ingots of zinc-4% Al-1% Cu cast showed good plastic properties. Tables, graphs, micrographs. 9 ref. (Q23, Al, Ni)

705-Q. (Russian.) **Effect of Surface-Active Substances and Oxide Films on the Deformation Process of Monocrystals of Cadmium.** V. S. Ostrovskii and V. I. Likhtman. *Doklady Akademii Nauk SSSR*, v. 96, no. 2, May 11, 1954, p. 319-321.

Effect studied in solutions of oleic acid in isooctane and n-butyl alcohol in water at optimal concentrations. Graphs. 12 ref. (Q24, Cd)

706-Q. (Russian.) **The Theory of Flow of Plastic Substances Along Surfaces.** A. A. Il'iushin. *Prikladnaia Matematika i Mekhanika*, v. 18, no. 3, May-June 1954, p. 265-288.

Calculation of plastic flow of thin-walled shells subject to pressure forming. Diagrams. 2 ref. (Q23, G general)

707-Q. The Influence of Oxygen, Nitrogen, and Carbon on the Mechanical Properties and Microstructure of Titanium. O. Z. Rylski and H. V. Kinsey. *Canadian Journal of Technology*, v. 32, July 1954, p. 146-150 + 1 plate.

Titanium containing as much as 0.25% oxygen, 0.15% carbon, 0.08% nitrogen, and about 0.35% combined iron and aluminum possesses acceptable mechanical properties. Maximum limit on these impurities before a serious deterioration of properties occurs is 0.32% oxygen, 0.18% carbon, 0.10% nitrogen and 0.40% combined iron and aluminum. Tables, graphs, photograph, and micrographs. 6 ref. (Q general, M27, Ti)

708-Q. Reinforced Holes in Plates. Raymond Hicks. *Engineering*, v. 177, June 25, 1954, p. 811-812.

Analysis of stresses and determination of reinforcing required. Diagram. (Q25)

709-Q. Measuring Loads in Wires. N. W. B. Clarke. *Engineering*, v. 177, June 25, 1954, p. 812-815.

Methods of eliminating errors in measuring prestressing loads in concrete beams. Photographs, diagrams. (Q27)

710-Q. Effect of Titanium in Steel. Parvez Mehta. *Indian Institute of Metals, Transactions*, v. 5, 1951, p. 111-138; disc., p. 138-140.

Influence of titanium contents of up to 0.6% on the structure and properties of medium carbon-manganese and low carbon-nitrogen steels. Macrographs, sulfur prints, micrographs, graphs, tables. (Q general, M27, CN, AY)

711-Q. The Structure of Cold Worked Steels. E. G. Ramachandran. *Indian Institute of Metals, Transactions*, v. 5, 1951, p. 187-213; disc., p. 214.

Effects of cold work on mechanical and physical properties. Diagrams, graphs, table. 15 ref. (Q general, P general, ST)

712-Q. Hardness and Work-Hardenability of Metals and Alloys. G. P. Chatterjee. *Indian Institute of Metals, Transactions*, v. 5, 1951, p. 245-257; disc., p. 257-259.

Analysis of hardness testing. Effect of work hardenability on test values. Graphs, diagrams, tables. 6 ref. (Q29)

713-Q. Rate of Work-Hardening of Some Aluminum-Copper Alloys. G. P. Chatterjee, K. C. Shome and R. Ganguly. *Indian Institute of Metals, Transactions*, v. 5, 1951, p. 261-269; disc., p. 269.

Effect of copper on rate of work hardening of aluminum. Graphs, tables. 5 ref. (Q29, Al, Cu)

714-Q. The Influence of Wear-Product in Accelerating Wear. M. S. Mitra and L. R. Vaidyanath. *Indian Institute of Metals, Transactions*, v. 5, 1951, p. 295-309.

Wear due to rolling friction studied under dry conditions. Table, photographs, graphs. 13 ref. (Q9)

715-Q. G-Modulus Temperature Coefficient for Beryllium Copper Wire. John T. Richards. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, July 1954, p. 827-828.

Thermoelastic characteristics. Table, graphs. 4 ref. (Q21, Cu)

716-Q. Drop Weight Test Measures Notch Ductility. W. S. Pellini, G. A. Sandoz and H. F. Bishop. *Iron Age*, v. 174, July 8, 1954, p. 100-103.

Simple method for measuring notch ductility of nodular cast irons. Diagrams, graphs, photographs. (Q23, CI)

717-Q. Control and Programming of a 200,000-Pound Fatigue Machine. H. C. Roberts and V. J. McDonald. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 1-10.

Application of control system to lever-type machine. Diagrams, graphs, photographs. 4 ref. (Q7)

718-Q. Simplified Measurement of Residual Stresses. J. L. Waisman and A. Phillips. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 29-44.

Rapid, accurate technique for measuring residual stress gradient developed in plates by various manufacturing operations. Diagrams, photograph, graphs. 7 ref. (Q25)

719-Q. Network Representation of Elastic Problems in Cylindrical Coordinates. W. A. Gross and W. W. Soroka. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 45-58.

Equivalent circuits developed by Gabriel Kron to represent partial differential equations of the theory of elasticity extended to the three-dimensional problem in cylindrical coordinates. Tables, diagrams, graphs. 8 ref. (Q21, Q25)

720-Q. Experimental Stress Determination Within a Metal During Plastic Flow. E. G. Thomsen and J. T. Lapsley, Jr. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 59-68.

Graphical method permits calculation of stress distribution within plastic zone of a metal. Diagrams, photograph, graphs. (Q25, Q24)

721-Q. Theory and Techniques of Calibration for Structural Flight Load Measurement. L. Rogin. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 69-80.

General approach to problem of evaluating flight loads imposed on aircraft structural components by means of measured strains in the structure. Diagrams, tables. 8 ref. (Q25)

722-Q. Plastic Models for Vibration Analysis. G. O. Sankey. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 81-90.

Demonstrates feasibility of using conveniently scaled plastic models to predict dynamic response of complex structures, particularly those of critical frequencies and mode shapes. Diagrams, photographs, tables, graphs. (Q9)

723-Q. A New Dynamic Creep Testing Machine. Y. H. Pao and J. Marin. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 107-114.

A 4-unit creep testing machine in which a specimen may be subjected to a fluctuating load consisting of a mean static load and an alternating load. Diagrams, graphs, photographs. 4 ref. (Q3)

724-Q. The Prediction of Dynamic Performance of Full-Scale Gun Turrets From Static Tests of Small-Scale Models. E. Wenk, Jr. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 115-132.

Truss-type gun girder checked for structural strength by static tests of a 1/10-scale model, and later by static and dynamic tests of a full-scale pilot turret and by shipboard firing trials. Results analyzed to determine accuracy of prediction of small-scale models. Photographs, diagrams, graphs, table. (Q general)

725-Q. Photoelastic Analysis of Reinforced Stress Raisers. J. B. Mantle. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 161-172.

Observation of manner in which circumferential stresses at a reinforced hole in a tension member varied through the member with different cross-sectional shapes of reinforcing rings. Diagrams, photographs, graphs, table. 3 ref. (Q25)

726-Q. Improved Brittle Coatings for Use Under Widely Varying Temperature Conditions. F. N. Singdale. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 173-178.

Vitreous enamels as stress indicators. Photographs. (Q25)

727-Q. Stress Concentration Factors for a Single Notch in a Flat Bar in Pure and Central Bending. M. M. Leven and M. M. Frocht. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 179-184.

Determination by photo-elastic methods. Graphs, stress patterns. 6 ref. (Q25)

728-Q. Relation Between Stress Analysis and Fatigue of Metals. R. E. Peterson. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 199-206.

Prediction of fatigue failures by determination of stress distribution patterns. Photographs, diagrams, graphs. 11 ref. (Q25, Q7)

729-Q. Interpretation of Creep and Long-Time Test Data. J. Marin. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 207-212.

Interpretation to determine working stresses. Graphs, tables. 8 ref. (Q3)

730-Q. High Temperature Test Data. A. W. Brunot. *Society for Experimental Stress Analysis, Proceedings*, (Annual Volume), v. 11, no. 2, 1954, p. 213-216.

Problems in tensile testing at elevated temperatures. Effects of vibrations. (Q23)

731-Q. Engineering Data Sheet No. 166. Approximate Shear Strengths of Aluminum Fillet Welds. *Welding Engineer*, v. 39, July 1954, p. 47.

Graphs for 2S, 43S, 52S, 54S aluminum. (Q2, Al)

732-Q. (German.) **The Strain Gage Method. III. Handling of Industrial Strain Gages.** C. Rohrbach. *Archiv für technisches Messen,* 1954, no. 221, June, p. 135-138.

Preparation of materials, type of glue, drying and operation. Photographs. 7 ref. (Q25)

733-Q. (Russian.) **Stress Concentration in Sheet Elements of Metallic Structures.** N. D. Tarabasov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1953, no. 12, Dec., p. 1700-1735.

Methods and equations for approximate solution of stress distribution problems between individual rivets. Diagrams. 5 ref. (Q25)

734-Q. (Russian.) **Effect of Boundary Zones Containing Low-Melting Components Upon Results of the Determination of Heat Resistance of Alloys by Various Deformation Methods.** A. A. Bochvar, M. E. Drits and E. S. Kadaner. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 2, Feb., p. 42-45.

Determination of hardness of several magnesium alloys during heating from 25 to 300° C. Micrographs, tables, charts. (Q29, Mg)

735-Q. (Russian.) **Influence of Impurities on Heat Resistance of Aluminum.** A. A. Bochvar, Z. A. Sviderskaia and L. M. Kychakova. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 2, Feb., p. 46-51 + 1 plate.

Influence of iron and silicon on high-temperature hardness. Tables, graphs, micrographs. (Q29, Al)

736-Q. (Russian.) **The Mechanism of Stress Relaxation in Metals.** B. M. Rovinskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 2, Feb., p. 67-74.

Data from tests on aluminum and copper show departure from true elasto-viscous flow. Graphs. 11 ref. (Q25, Al, Cu)

737-Q. (Russian.) **Distribution of Work Hardening in Rail Heads.** I. V. Vikker. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 2, Feb., p. 75-78.

Experimental investigation of plastic deformation. Table, graphs. 6 ref. (Q24, Q29, CN)

738-Q. (Russian.) **Carrying Capacity and Strength Calculation of Parts Under Static and Variable Stresses.** S. V. Serensen and L. A. Kozlov. *Vestnik Mashinostroeniia,* v. 33, no. 12, Dec. 1953, p. 3-11.

Fatigue strength of machine parts and use of fatigue test data in machine design. Graphs, diagrams, tables. 8 ref. (Q7)

739-Q. (Russian.) **Strength of Steel Tubes for High Pressure Boilers.** N. S. Leleev, E. A. Troianskii and I. K. Korikovskii. *Vestnik Mashinostroeniia,* v. 33, no. 12, Dec. 1953, p. 11-13.

Formula for calculating wall thickness required. Table, graph, photographs, diagram. 2 ref. (Q23, S14, ST)

740-Q. (Russian.) **Determining Basic Parameters of Process of Bending With Tension.** E. N. Moshnin. *Vestnik Mashinostroeniia,* v. 33, no. 12, Dec. 1953, p. 36-41.

Analysis is made assuming that plastic bending takes place in linear conditions of state of stress. No account is taken of center elastic-deformation zone. Table, diagrams, graphs. (Q5, Q27)

741-Q. (Russian.) **Creep of Tubes.** S. N. Kats. *Vestnik Mashinostroeniia,* v. 33, no. 12, Dec. 1953, p. 58-63.

Creep investigations of cylindrical vessels under internal pressure. Tables, graphs, photograph, diagram. (Q3, CN, AY)

742-Q. (Russian.) **Determining Residual Forces in Forgings of Turbine Disks.** M. M. Kobrin. *Vestnik Mashinostroeniia,* v. 34, no. 1, Jan. 1954, p. 29-34.

Stresses investigated in chromium-molybdenum steels by successive boring and cutting of rings from the hub. Diagrams, tables, photographs. 4 ref. (Q25, AY)

743-Q. (Russian.) **Efficiency of Surface Hardening of Parts With Transverse Holes.** I. V. Kudriavtsev and N. M. Savvina. *Vestnik Mashinostroeniia,* v. 34, no. 1, Jan. 1954, p. 61-65.

Tests with steel plates and rods to establish effects of cold hardening on fatigue strength during blending and torsion. Tables, graphs, photographs. 4 ref. (Q7, J28, CN)

744-Q. (Russian.) **Effect of Cold Working by Shot Peening on Impact Fatigue Strength of Steel.** N. A. Karasev. *Vestnik Mashinostroeniia,* v. 34, no. 1, Jan. 1954, p. 66-68.

Experimental results. (Q7, G23, ST)

745-Q. (Swedish.) **Tentative Classification of Mild Steel With Regard to Tendencies Toward Brittle Fracture.** Gunnar Malmberg. *Jernkontorets Annaler,* v. 138, no. 6, 1954, p. 333-349.

Proposal for evaluation of steels according to impact test data. Diagrams, charts, tables. 5 ref. (Q26, Q6, ST)

746-Q. (Book.) **The First Midwestern Conference on Solid Mechanics, Proceedings.** 199 p. 1953. University of Illinois, Engineering Experiment Station, Urbana, Ill. $5.00.

Consists of 38 papers on strength of structures and materials. (Q23)

747-Q. (Book.) **Mechanical Properties of Machinability Program Work Materials.** 29 p. U. S. Dept. of Commerce, PB 111296, Office of Technical Services, Washington 25, D. C. $1.00.

Tensile tests plotted as curves of stress versus natural strain. Results of Brinell hardness tests. (Q27, Q29, G17)

748-Q. (Book.) **Mechanical Testing of Metallic Materials.** R. A. Beaumont. 3rd Ed. 250 p. Sir Isaac Pitman & Sons Ltd. Pitman House, Parker Street, Kingsway, London. 25s.

Improved methods of proof stress. Application to aeronautical and general engineering. (Q general)

749-Q. (Book.) **Mechanics of Materials.** Philip Gustave Laurson and William Junkin Cox. 3rd Ed. 414 p. 1954. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $5.75.

Stresses and deformation in beams, shafts, springs, joints, and pressure vessels. (Q general)

750-Q. (Book.) **Properties of ML Aluminum Alloy.** 50 p. 1948. U. S. Air Force, U. S. Dept. of Commerce, PB 111329, Office of Technical Services, Washington 25, D. C. $1.00.

Casting and heat treating practices to improve mechanical and physical properties. Stress-rupture and creep properties. (Q general, P general, Al)

751-Q. (Book.) **Twinning and Diffusionless Transformations in Metals.** E. O. Hall. 181 p. 1954. Butterworths Scientific Publications, Ltd., 4-6 Bell Yard, Temple Bar, London W.C. 2, England. 30s.

Structure and deformation of metal crystals; twinning; effects of stress and heat treatment. (Q24, M26, M27)

752-Q. (Book—French.) **(Strength of Materials.) Résistance des Matériaux.** Robert L'Hermite. v. I. 860 p. 1954. Dunod, 92 rue Bonaparte, Paris 6, France. 8400 fr.

Theory of elasticity; internal equilibrium under tension, bending, and torsion; and analysis of isostatic structures, girders, and girder systems; thorough treatment of plates, slabs, and shells. (Q23, Q21)

R
Corrosion

283-R. Effect of Alloy and Impurity Elements in Magnesium Alloy Cast Anodes. H. R. Robinson and P. F. George. *Corrosion,* v. 10, June 1954, p. 182-188.

Illustrates need for low impurity levels in the 6% aluminum-3% zinc magnesium alloy cast anodes. Micrograph, tables, graphs. 3 ref. (R2, Mg)

284-R. Minimizing Damage to Adjacent Structures in Urban Cathodic Protection Installations. D. T. Rosselle. *Corrosion,* v. 10, June 1954, p. 192-194.

Damage may be minimized by distributing anodes parallel to the structure to be protected and using as many small rectifiers as economically feasible. Diagram. (R10)

285-R. Laboratory Studies on the Pitting of Aluminum in Aggressive Waters. T. E. Wright and Hugh P. Godard. *Corrosion,* v. 10, June 1954, p. 195-198.

Movement of tap water reduces both pitting probability and rate: Beyond a certain velocity, no pitting occurs. Tables, diagram, photograph. 3 ref. (R4, Al)

286-R. Corrosion of Nickel Cast Irons in Soils. Irving A. Denison and Melvin Romanoff. *Corrosion,* v. 10, June 1954, p. 199-204.

Measurements of corrosion and strength of nickel cast irons after exposure to different soil conditions for a maximum of 14 yr. Tables, photographs. 4 ref. (R8, CI)

287-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 46, June 1954, p. 93A-94A, 96A.

Preparation of sample and exposure techniques in corrosion testing. Photographs. (R11)

288-R. Descaling of Evaporator Heating Surfaces in Cane Sugar Factories. N. O. Schmidt and L. F. Wiggins. *Industrial and Engineering Chemistry,* v. 46, May 1954, p. 867-870.

Experiments on prevention and removal of scale by chemical and mechanical means. Tables, photograph. 3 ref. (R2, L10, L12)

289-R. Cathodic Protection for Industrial Plants. J. H. Hirschfeld. *Industry and Power,* v. 66, June 1954, p. 66-70.

Use of magnesium and graphite anodes in 11 case histories showed distinct savings. Diagrams. (R10, Mg, C)

290-R. High-Temperature Durability of Molybdenum in Oxygen-Deficient Combustion Gases. Raymond Friedman. *Jet Propulsion,* v. 24, May-June 1954, p. 187.

Test data for uncoated molybdenum at temperatures up to 2600° F. Corrosion rates can be tolerated in many applications. (R9, Mo)

291-R. Factors Affecting the Testing of Stainless Steels in Boiling Concentrated Nitric Acid. J. E. Truman. *Journal of Applied Chemistry,* v. 4, May 1954, p. 273-283.

Effect of condenser system, amount of sexivalent chromium in acid solution, strength of acid and composition of steel. Graphs, diagrams, tables. 3 ref. (R11, SS)

292-R. Early Stages of Fretting of Copper, Iron & Steel. D. Godfrey and J. M. Bailey. *Lubrication Engineering,* v. 10, May-June 1954, p. 155-159.

Procedure included a continuous recording of friction force and microscopic examination of fretted contact areas. Diagram, micrographs, graphs. 5 ref. (R1, Cu, Fe, ST)

293-R. Avoiding Underground Corrosion. O. C. Mudd. *Petroleum Refiner,* v. 33, June 1954, p. 172-174.

Methods can increase value of present corrosion-mitigation efforts and reduce corrosion in future installations. Photographs, diagrams. (R8)

294-R. Corrosion Investigating Techniques. J. B. Armstrong. *Petroleum Refiner,* v. 33, June 1954, p. 176-179.

Field and laboratory methods to locate pitting and weak spots, measure corrosion rates, pinpoint corrosion problem and evaluate inhibitors. Diagrams. 4 ref. (R11)

295-R. Combating Corrosion Offshore. Frank Dial. *World Oil,* v. 138, June 1954, p. 206, 208, 210, 212.

Zones of attack and corrective measures for offshore drilling equipment. Photographs, table. (R4)

296-R. Magnesium Anodes Protect Aransas Bay Flow Lines. Wayne A. Johnson. *World Oil,* v. 138, June 1954, p. 246, 248, 250.

Cathodic protection of gas pipelines laid in salt water and moist land. Maps, photographs. (R10)

297-R. Effect of Microstructure on Corrosion. Herbert H. Uhlig. Paper from "Relation of Properties to Microstructure". American Society for Metals, p. 189-208.

Microstructure may have no influence on corrosion of some metals in some environments, whereas for other situations microstructure is of primary importance. Graphs, tables, micrographs, photographs. 23 ref. (R1, M27, CN, AY)

298-R. Effect on Specimen Dimensions Upon Adsorption Fatigue and Corrosion Fatigue of Steel. G. V. Karpenko and A. V. Karlashov. *Henry Brutcher, Altadena, Calif., Translation no.* 3252, 7 p. (From *Doklady Akademii Nauk SSSR,* v. 92, no. 3, 1953, p. 603-605.)

Previously abstracted from original. See item 148-R, 1954. (R1, AY)

299-R. Effect of Heat Treatment of Titanium-Stabilized 18-9 Cr-Ni Stainless Steel With Varying C-Ti Ratio Upon Its Resistance to Intergranular Corrosion. E. I. Astrov and V. N. Biryukova. *Henry Brutcher, Altadena, Calif., Translation no.* 3258, 11 p. (From *Vestnik Mashinostroeniya,* v. 33, no. 9, 1953, p. 61-65.)

Previously abstracted from original. See item 94-R, 1954. (R2, J26, SS)

300-R. (German.) **Corrosive Effect of Water on Iron Despite the Observance of the Lime-Carbon Dioxide Balance.** A. Splittgerber. *Energietechnik,* v. 4, no. 3, Mar. 1954, p. 131-132.

Chemical investigation of cause of corrosion in pipes of steam power plant. Measures for prevention. 5 ref. (R4, R10)

301-R. (German.) **Investigations of the Porosity of Iron and Iron Oxide. I. Contribution to the Corrosion Problem of Iron.** Georg Graue. *Werkstoffe und Korrosion,* v. 5, no. 5, May 1954, p. 161-167.

Possibility of active diffusion of oxygen affecting results of experiments involving Wagner-Schottky corrosion theory. Tables, graphs. 33 ref. (R2, Fe)

302-R. (German.) **The Application of Electrochemical Methods to Investigation of Corrosion of Steel by Fluorides.** Walter Katz and Th. Kempf. *Werkstoffe und Korrosion,* v. 5, no. 5, May 1954, p. 172-177.

Evidence of passivation indicated by anodic leg of current potential curve. Graphs, micrograph, table. (R10, ST)

303-R. (Hungarian.) **Selective Corrosion of Carbon Steel.** Pal Csokan. *Öntöde,* v. 5, no. 5, May 1954, p. 114-116.

Structural investigation and interpretation of phenomenon. Photographs, micrographs. 4 ref. (R1, CN)

304-R. (Italian.) **Advantages of Anodic Oxidation of Aluminum for Water-Alcohol Solution Containers.** V. Tamburrini. *Alluminio,* v. 23, no. 2, Mar. 1954, p. 151-152.

Results of experimental corrosion tests. Protective efficiency. Table. 3 ref. (R11, L19, Al)

305-R. (Italian.) **Properties of Low-Carbon, Phosphorus and Copper Alloyed Structural Steels. II. High-Temperature Oxidation. Accelerated Oxidation Phenomena of Steels in Presence of Phosphorus and Copper.** Collari Nello and Fongi Nella. *Metallurgia italiana,* v. 46, no. 4, Apr. 1954, p. 111-122.

Efficiency of phosphorus. Formation of a eutectic phase with melting temperature around 800° C. Tables, graphs, micrographs. 15 ref. (R2, ST, Cu)

306-R. (Italian.) **Theoretical and Experimental Study of Some Phenomena of Dezincification in Brasses. III. Methods for the Study of the Dezincification Phenomena and Results Obtained on Hard and Soft Alpha Single Phase Brasses and Alpha + Beta Two-Phase Brasses With Additions of Inhibitors.** Paolo Lombardi. *Metallurgia italiana,* v. 46, no. 4, Apr. 1954, p. 123-140.

Tests on two types of brasses with additions of lead, arsenic and phosphorus to determine best protection against corrosion. Micrographs, diagrams, table. 19 ref. (R2, Cu)

307-R. (Russian.) **Problem of Positive Difference-Effect.** A. F. Bogoiavlenski and L. N. Umova. *Zhurnal Prikladnoi Khimii,* v. 27, no. 5, May 1954, p. 548-551.

Explains increased localized corrosion because of the introduction of a strong cathode. Data for Zn-Pt couple in hydrochloric acid. Graphs. 3 ref. (R1, Zn)

308-R. Caustic Cracking in Steam Boilers. *British Engine, Boiler & Electrical Insurance Co. Ltd., Technical Report,* New ser., v. I, Nov. 1952, p. 9-56.

Characteristic features, detection of cracking, effect of boiler water composition. Examples. Photographs, diagrams, micrographs. (R4)

309-R. Cathodic Protection of Ships and Marine Structures. K. A. Spencer. *Chemistry & Industry,* 1954, no. 25, June 19, p. 702-708.

Principles, anodes, exterior and interior protection. Diagrams, tables. 16 ref. (R10)

310-R. The Corrosive Effects of Fluorine. *Industrial Chemist and Chemical Manufacturer,* v. 30, June 1954, p. 266-268.

Resistance of steels and nonmetallic materials. Weaknesses of piping joints and valves. 8 ref. (R5, CN, SS)

311-R. Service Experience of the Effect of Corrosion on Steel-Cored Aluminium Overhead-Line Conductors. J. S. Forrest and J. M. Ward. *Institution of Electrical Engineers, Proceedings,* v. 101, pt. 2, no. 81, June 1954, p. 271-283; disc., p. 283-290.

Average rate of deterioration, based on the reduction in mechanical strength, is 0.4-0.5% per yr. Average service life of the conductor is 25-30 yr. Graphs, tables, diagrams, photographs. 12 ref. (R3, ST, Al)

312-R. Electrolytic Etch Cuts Corrosion Test Time. J. D. Roach and H. H. Hollenbeck. *Iron Age,* v. 173, June 24, 1954, p. 100-103.

Corrosion test time for some stainless steels can be sharply cut with a new eelctrolytic oxalic acid etch test. Tables, micrographs. (R11, SS)

313-R. Corrosion in Piping and Heating Equipment. Floyd Brown. *North Carolina State College (Engineering School Bulletin, Industrial Information Series Bulletin no.* 8), Apr. 1954, 36 p.

Corrosion in hot water storage tanks, piping, boilers and condensate return lines. Diagrams, tables, photographs. 28 ref. (R4)

314-R. Fundamental Study of Erosion Caused by Steep Pressure Waves. B. G. Rightmire and J. M. Bonneville. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3214, June 1954, 30 p.

Effect on annealed copper surfaces of steep-fronted pressure waves in oil. Cavitation of oil is the probable cause of damage. Graphs, photographs, diagrams, tables. 11 ref. (R2, Cu)

315-R. High Pressure Oxidation Rates of Metals. W. Martin Fassell, Jr., Robert C. Peterson, Donald W. Bridges and John P. Baur. Resume of paper presented at Pacific Northwest Metals and Minerals Conference of the A.I.M.E., 1954, Portland, Ore. 2 p.

Includes diagram. 3 ref. (R2)

316-R. Cathodic Protection and Galvanizing. H. A. Robinson. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 396-426.

Elements of cathodic protection and equipment in practice. Application and performance of zinc coatings. Diagrams, graphs, tables, photographs, micrographs. 24 ref. (R10, L16, Zn)

317-R. Vapour Phase Corrosion Inhibitors. A. B. Cox and E. C. Kuster. Commonwealth of Australia, Department of Supply, Defence Standards Laboratories Circular 16, Jan. 1954, 7 p.

Accelerated corrosion tests on the Shell Development Co.'s VPI-260 ("Dichan"). Table. 23 ref. (R10)

318-R. (French.) **The Structure of Oxidation Interface of Iron.** Raymond Sifferlen and Robert Collongues. *Comptes rendus,* v. 238, no. 22, May 31, 1954, p. 2167-2169.

Observation of thin zone of very fine crystals during first hour of oxidation. Micrographs. 4 ref. (R2, M26, Fe)

319-R. (German.) **Factors in the Porosity and Gas Diffusion in Ferric Oxides and Mixed Oxides. II.** Georg Graue. *Werkstoffe und Korrosion,* v. 5, no. 6, June 1954, p. 212-216.

Radioactive gases used to determine porosity of oxide films on iron. Influence of alloy composition, temperature and humidity on structure and porosity. Tables, graphs. 6 ref. (R2, M27, N1, Fe)

320-R. Resistance of Refractories to Molten Lead-Bismuth Alloy. James J. Gangler. *American Ceramic So-*

ciety, Journal, v. 37, July 1954, p. 312-316.

Corrosion resistance of 18 ceramics and cermets, 13 refractory metals and 9 high-temperature alloys to attack by 44.5% Pb, 55.5% Bi eutectic alloy. Photographs, diagram, tables. (R6, SG-h, EG-d)

321-R. Kinetics of the High Temperature Oxidation of Zirconium. Jack Belle and M. W. Mallett. *Electrochemical Society, Journal,* v. 101, July 1954, p. 339-342.

Rate of oxidation of high-purity zirconium determined for temperature range 575 to 950° C. at 1 atmosphere pressure. Graphs, table, micrographs. 8 ref. (R2, Zr)

322-R. New Oil-Soluble Antirust Agent Gives Lasting Protection for Products Pipelines. S. Kleinheksel, P. Lawrence and F. L. Nelson. *Oil and Gas Journal,* v. 53, July 12, 1954, p. 94-98.

Mechanism of corrosion inhibitors. Field tests of "Santolene C". Graphs, diagram. 7 ref. (R10, R7)

323-R. Humidity Cabinets Don't Tell the Whole Story. Louis Schlossberg. *Steel,* v. 135, July 12, 1954, p. 114-116, 118.

Concludes accelerated laboratory corrosion tests show poor correlation with actual field results. Photographs, graphs, tables. 15 ref. (R11)

324-R. (French.) **Structure and Corrosion Fatigue of Al-Mg Alloys.** C. Panseri. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 20, no. 5, May 1954, p. 152-156.

Effect of heat treatment. Micrographs, photographs, diagrams, graphs. (R1, J general, Al, Mg)

325-R. (Swedish.) **Stress-Corrosion Cracking in Mild Steel, Caustic Embrittlement.** E. Rudberg and R. Arpi. *Jernkontorets Annaler,* v. 138, no. 6, 1954, p. 350-382.

Experiments with U-bent specimens and comparisons between different test methods. Graphs, tables, diagrams. 31 ref. (R1, CN)

326-R. (Russian.) **The Mechanism of Action of Anticorrosive Additions to Mineral Oils.** B. V. Losikov, O. P. Makasheva and L. A. Aleksandrova. *Neftianoe Khoziaistvo,* v. 32, no. 4, Apr. 1954, p. 65-72.

Effect of temperature on formation and properties of protective films. Chemical nature of films. Graphs, tables. (R10)

327-R. (Book.) **Corrosion.** 60 p. 1953. Butterworth's Scientific Publications, 88 Kingsway, W.C.2, London; also Interscience Publishers, Inc., 250 Fifth Ave., New York 1. $1.75.

A series of papers on corrosion, cathodic protection of ships, prevention of corrosion by coatings, corrosion testing, and corrosion inhibitors, reprinted from *Research,* vol. 5, 1952. (Papers separately abstracted in Review of Metal Literature, vol. 9, 1952.)
(R general, L general)

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Inspection and Control

234-S. Choose Gear Inspection Methods to Meet Product Needs. Fred Bohle. *Iron Age,* v. 173, May 27, 1954, p. 120-125.

Functional and analytical methods described and compared. Photographs, diagrams, tables, graphs. (S14)

235-S. New Instrument Simplifies Diamond Die Inspection. Max Davies. *Iron Age,* v. 173, June 10, 1954, p. 130-132.

Images cast on a screen from a light reflected through the diamond permit observation of scoring, cracks, rings, changes in taper and other flaws. Photographs. (S13)

236-S. Determination of Tin-Iron Alloy Coating in Electro-Tinplate. C. J. Thwaites and W. E. Hoare. *Journal of Applied Chemistry,* v. 4, May 1954, p. 236-244.

Coulometer method, involving measurement of quantity of electricity required to dissolve coating anodically in dilute hydrochloric acid, found suitable on relatively small specimens. Diagram, tables, radiogram. 11 ref.
(S11, L17, Sn, Fe)

237-S. Practical Production Tolerances. Warren J. Grosjean. *Machine Design,* v. 26, June 1954, p. 108-114.

Design of electric timing units. Graphs, photographs, diagrams. (S14)

238-S. Government Finishing Specifications. II. N. E. Promisel and David M. Promisel. *Metal Finishing,* v. 52, June 1954, p. 95-101.

Metal coatings and surface treatments. Tables. (S22, L general)

239-S. Precision in Measuring and Methods of Evaluation. H. Schulz. *Microtecnic (English Ed.),* v. 8, no. 2, 1954, p. 80-83.

Microscopes and magnification selection for industrial inspection and testing. Graphs, table, diagrams. (S general)

240-S. Ultrasonics as a New Non-Destructive Means of Testing Materials in the Precision Mechanics Industries. Reimar Pohlman. *Microtecnic (English Ed.),* v. 8, no. 2, 1954, p. 84-88.

Principles, equipment and methods. Photographs, graphs, diagrams. 3 ref. (S13, S14, S15)

241-S. Some Factors of Importance in Ultrasonic Testing. J. B. Morgan. *Nondestructive Testing,* v. 12, May-June 1954, p. 13-18.

Effects of distance of a discontinuity below the surface of the article, geometry of the article, frequency, size and sensitivity of searching unit (transducer) and performance of ultrasonic instrument. Graphs. 2 ref. (S13, Al)

242-S. Radioisotopes in Nondestructive Testing. Paul C. Aebersold. *Nondestructive Testing,* v. 12, May-June 1954, p. 19-26.

Survey of industrial uses of gamma-ray emitters, including radiography, thickness measurement, liquid level, flow indication and wear testing. Diagrams, tables. (S19)

243-S. Magna Scanning. Arthur N. Haig. *Nondestructive Testing,* v. 12, May-June 1954, p. 27-28.

Novel technique combines radiographic scanning with magnification. Photographs. (S19)

244-S. Immersed Ultrasonic Inspection With Automatic Scanning and Recording of Warning Signal. John C. Smack. *Nondestructive Testing,* v. 12. May-June 1954, p. 29-33.

Inspection is applied automatically using contact or immersed testing techniques on important parts such as forged gun barreis and jet-engine rotors. Photographs, diagrams, chart. (S13)

246-S. Eddy Current Testing by Impedance Analysis. Richard Hochschild. *Nondestructive Testing,* v. 12, May-June 1954, p. 35-44, 51.

A review of AEC-supported development work at Hanford on eddy current methods for application requiring high sensitivity, dependability and rapid automatic handling during testing of metal parts. Graphs, diagrams, photograph. (S13)

247-S. Discussion of Radiographic Characteristics of High Energy X-Rays. D. A. Scag. *Nondestructive Testing,* v. 12, May-June 1954, p. 45-46.

Any betatron in the range of 15 to 30 mv. will give most of the advantages obtainable in megavoltage radiography. Graphs. 14 ref. (S13)

248-S. A Graphical Method for Rapid Estimation of the Thickness of Evaporated Metal Films. K. P. Nandy. *Review of Scientific Instruments,* v. 25, May 1954, p. 523-524.

Determines thickness of evaporated metal films using nomograph on a linear scale. Chart. 2 ref. (S14)

249-S. Nondestructive Testing. Donald C. Hart. *Steel,* v. 134, June 21, 1954, p. 124-125.

Applications of X-ray, radiography, magnetic particle, surface temper, dye penetrants and ultrasonics in automobile manufacture. Photographs, micrographs. (S13)

250-S. Experiments on the Ultrasonic Testing of Cast Iron. H. J. Seemann. *Henry Brutcher, Altadena, Calif., Translation no.* 3117, 13 p. (Condensed from *Giesserei, Technisch-Wissenschaftliche Beihefte,* 1952, no. 9, p. 403-408.)

Behavior of ultrasonic waves in gray irons with various graphite contents and structures. Tables, diagrams, reflectograms. 13 ref. (S13, CI)

251-S. Practical Experiences Gained in the Ultrasonic Inspection of Turbo Generator Rotor Forgings as Acceptance Test. R. Schinn. *Henry Brutcher, Altadena, Calif., Translation no.* 3230, 10 p. (Condensed from *Metall,* v. 7, no. 13-14, 1953, p. 502-506.)

Location of reflection zones and deductions concerning their nature. Information obtained by supplementary mechanical tests on trepanned cores confirmed the ultrasonic test results. Photographs, diagrams. (S13)

252-S. Ultrasonic Testing of Semi-finished Light-Metal Products. I. Ultrasonic Testing of Light-Metal Semi-products and Permanent-Mold Castings. II. J. Krautkrämer and W. Roth. *Henry Brutcher. Altadena, Calif., Translation no.* 3245, 12 p.; no. 3246, 9 p. (Condensed from *Zeitschrift für Metallkunde,* v. 44, no. 5, 1953, p. 198-202; p. 202-205.)

Previously abstracted from original. See item 250-S, 1953. (S13)

253-S. Ultrasonic Testing of Steel Rounds for Internal Defects. H. G. Brandt. *Henry Brutcher, Altadena, Calif., Translation no.* 3247, 9 p. (From *Stahl und Eisen,* v. 73, no. 26, 1953, p. 1717-1720.)

Previously abstracted from original. See item 99-S, 1954. (S13, TS)

254-S. (French.) **Examples of Industrial Application of Radioactivity.** J. Guéron. *Journal de physique et le radium,* v. 15, supp. no. 5, May 1954, p. 65A-75A.

Application based on absorption of radiation and analysis by activation or isotopic dilution. Diagrams, graphs. 39 ref. (S19)

255-S. (German.) **Ultrasonic-Impulse-Reflection Method for Non-Destructive Testing of Materials. II. Practical Experiences During the Testing of Various Materials and Shapes of Specimens as Well as Supports. III. Practical Experience During Examination of Welded Seams and Pipes. Radiography.** A. Lutsch. *Archiv für technisches Messen.* 1954, no. 219, Apr., p. 81-84; no. 220, May, p. 109-110.

Velocity of impulses, elastic constants, reflection on boundary sur-

faces and testing procedure. Diagrams, table, graphs. 25 ref. (S13)

256-S. Failure of Rotating Shafts Due to Repairs by Welding. *British Engine, Boiler & Electrical Insurance Co. Ltd., Technical Report,* New ser., v. I, Nov. 1952, p. 114-123.

In certain cases welding is inadvisable or if used must be applied with particular care. Photographs, micrographs, diagrams. (S21)

257-S. In Stainless Wire—Nondestructive Test Gives Austenite, Martensite Percentages. Samuel Storchheim. *Iron Age,* v. 174, July 1, 1954, p. 108-111.

Method combines magnetic test and X-ray diffraction techniques. Graphs, tables, photograph. (S11, M23, SS)

258-S. Reproducibility of the Freezing Temperature of High-Purity Zinc. E.H. McLaren. *Journal of Applied Physics,* v. 25, June 1954, p. 808.

Possibility of using freezing temperature of zinc as an alternative to sulfur fixed point on the international temperature scale. 3 ref. (S16, Zn)

259-S. Charts Used for Controlling Quality of Assemblies. Martin H. Saltz. *Tool Engineer,* v. 33, July 1954, p. 74-77.

Steps for setting up charts for control of defects. Photograph, graphs. (S12)

260-S. Isotope Inspection Controls Quality of Product. E. W. Bratton. *Tool Engineer,* v. 33, July 1954, p. 78-81.

Nuclear gaging of coated abrasives. Photographs, diagram, graphs. (S12)

261-S. Specifications for the Painting of Metals. Joseph Bigos. Paper from "Surface Protection Against Wear and Corrosion". American Society for Metals, p. 378-395.

Writing of specifications for performance, test requirements and composition. Example. 32 ref. (S22, L26)

262-S. (German.) **Lead Intensifying Screens for Industrial Radiographs.** H. Möller and W. Nosbüsh. *Schweissen und Schneiden,* v. 6, no. 6, June 1954, p. 254-256.

Process and rate of intensification, contrast and surface condition. Graphs. (S13)

263-S. (German.) **Progress in the Testing of Materials With Ultrasonics.** Josef Krautkrämer. *Zeitschrift für Mettallkunde,* v. 45, no. 4, Apr. 1954, p. 154-157.

Development of impulse-echo process. Decrease in wear, increase in rate of testing, various new constructions and metallographic applications. Diagrams, photographs. (S13, ST)

264-S. (German.) **Determination of Lines of Segregation in an Ingot of an Aluminum-Magnesium-Silicon Alloy by Means of Ultrasonic Reflection Method.** Gerhard Lucas and Adolf Lutsch. *Zeitschrift für Metallkunde,* v. 45, no. 4, Apr. 1954; p. 158-160.

Method eliminates necessity of using X-ray or making ingot unusable for further processing. Interpretation of test results and method of continuous control of ingots. Diagrams, photographs. (S13, Al, Mg, Si)

265-S. (German.) **Methods of Ultrasonic Testing in Metals Processing Industry.** Reimar Pohlman. *Zeitscrift für Metallkunde,* v. 45, no. 4, Apr. 1954, p. 161-165.

Possibilities for using impulse-echo and irradiation methods. Diagrams, photographs, graphs, micrograph. (S13)

266-S. (German.) **Theoretical and Experimental Basis of the Non-Destructive Testing of Materials With the Eddy Current Process. III. Process With Annular Coil for the Quantitative Non-Destructive Testing of Materials.** Friedrich Förster and Kurt Stambke. **IV. Practical Eddy-Current Instruments With an Annular Coil for the Quantitative Non-Destructive Testing of Materials.** Friedrich Förster. **V. The Quantitative Testing of Cracks of Metallic Materials by the Annular Coil.** Friedrich Förster and Helmut Breitfeld. **VI. Measuring Without Contact of the Thickness and Conductivity of Metallic Surface Layers of Foils and Plates. Pt. I. Theoretical Basis.** Friedrich Förster. **VII. The Magneto-Inductive Testing of Cracks in Steel.** Friedrich Förster. *Zeitschrift für Metallkunde,* v. 45, no. 4, Apr. 1954, p. 166 + 36 pages.

Theoretical and experimental basis for quantitative utilization. Industrial and metallographic application. Method for separating various effects. Magnatest-D process. Graphs, diagrams, tables. 66 ref. (S13, S14)

267-S. (German.) **Non-Destructive Tests of Cracks of Tungsten Rods by the Eddy-Current Method.** Albert Keil and Carl-Ludwig Meyer. *Zeitschrift für Metallkunde,* v. 45, no. 4, Apr. 1954, p. 194-196.

Practical experiences with the testing of rods of 2 to 8 mm. diameter. Typical defects, causes and possibilities of recognition. Micrographs. 8 ref. (S13, W)

268-S. (German.) **The Testing of Metal Coatings on Insulating Materials by an Eddy Current Process.** Albert Keil and Gertrud Offner. *Zeitschrift für Metallkunde,* v. 45, no. 4, Apr. 1954, p. 200-203.

Manufacturing processes for production of conductive metal layers. Conductivity, concept of "equivalent silver thickness" and measurement. Charts. 4 ref. (S15, P15, Ag)

269-S. (German.) **Industrial Application of a Probe Coil Instrument to Nonferrous Metals.** Gerhard Bunge. *Zeitschrift für Metallkunde,* v. 45, no. 4, Apr. 1954, p. 204-206.

Instrument requires only a 10 mm. scanning surface for registering the conductivity directly. Photograph, graphs. (S10, P15, Cu, Cr)

270-S. (German.) **Theoretical and Experimental Basis of tne Electromagnetic Sorting According to Quality of Steel Semifinished Products and Steel Parts. I. Magneto-Inductive Process With Consideration Only of the Fundamental Wave.** Friedrich Förster. *Zeitschrift für Metallkunde,* v. 45, no. 4, Apr. 1954, p. 206-211.

Effect of electrical conductivity, permeability, diameter of the specimen and testing frequency. Tables, diagrams. 15 ref. (S10, P15, P16, ST)

271-S. (German.) **Industrial Experience With Electromagnetic Sorting of Steels.** Helmut Krainer. *Zeitschrift für Metallkunde,* v. 45, no. 4, Apr. 1954, p. 212-217.

Possibilities and limitations of process as preliminary sorting process. Interpretation of results. Diagrams, micrographs. 16 ref. (S10, ST)

272-S. (German.) **Industrial Experience With the Eddy Current Testing of Cracks in Semifinished Steel Products.** Karl Sprungmann. *Zeitschrift für Metallkunde,* v. 45, no. 4, Apr. 1954, p. 227-230.

Factors effecting registration of cracks. Advantages of the process and pilot plant results. Photographs, graphs. (S13, ST)

273-S. (German.) **Electronic Classification of Defects by a Multitest Device.** Friedrich Wieland and Friedrich Rosche. *Zeitschrift für Metallkunde,* v. 45, no. 4, Apr. 1954, p. 231-233.

Application for automatic sorting of cracked antifriction bearings. Diagrams. (S13)

274-S. (German.) **Theoretical and Experimental Basis of the Electromagnetic Sorting According to Quality of Steel Parts. IV. The Residual Field Process.** Friedrich Förster. *Zeitschrift für Metallkunde,* v. 45, no. 4, Apr. 1954, p. 233-238.

Relation between residual force and coercive power. Sorting arrangement and industrial applications. Charts, diagrams. (S10, ST)

275-S. (German.) **Critical Consideration of the Magnetic Sorting of Steel Parts in Mass Production.** Johannes Ortheil. *Zeitschrift für Metallkunde,* v. 45, no. 4, Apr. 1954, p. 243-244.

Application of residual field method. Possibilties of testing uniformity of structure and chemical composition. Photograph, graph. (S10, S11, ST)

276-S. (German.) **Rapid, Non-Destructive Determination of Plate Anisotropy by Means of Residual Pole Process.** Friedrich Förster and Gustav Zizelmann. *Zeitschrift für Metallkunde,* v. 45, no. 4, Apr. 1954, p. 245-249.

Method, importance, examples and reproducibility of anisotropy measurements. Diagrams, graphs, photographs. 13 ref. (S13)

277-S. (German.) **Material Testing With Betatron-X-Rays.** R. Wideröe. *VDI Zeitschrift des Vereines deutscher Ingenieure,* v. 96, nos. 15-16, June 1, 1954, p. 450-456.

Use of new equipment for numerous tests. Diagrams, graphs, photographs. (S general)

278-S. A.I.S.I. Standard Alloy Steel Compositions. Openhearth and Electric Furnace Alloy Steels. *Metal Progress,* v. 66, July 1954, p. 112-B.

Covers bars, billets, blooms and slabs up to 200 sq.in., 18 in. wide or 10,000 lb. Revision of February 1954. Table. (S22, AY)

279-S. Statistics and Planning Tests at Elevated Temperatures. W. J. Youden. *Society for Experimental Stress Analysis, Proceedings,* (Annual Volume), v. 11, no. 2, 1954, p. 219-222.

Emphasizes need to test a group of specimens large enough to be statistically determinant. Table. 2 ref. (S12)

280-S. Crack Density Studies in "Stresscoat". A. J. Durelli and S. Okubo. *Society for Experimental Stress Analysis, Proceedings,* (Annual Volume), v. 11, no. 2, 1954, p. 153-160.

Systematic study of crack density as a function of the unidimensional state of stress in the material under the coating. Graphs, photograph. (S13)

281-S. Interpretation and Application of Inspection Test Data. P. V. Faragher. *Society for Experimental Stress Analysis, Proceedings,* (Annual Volume), v. 11, no. 2, 1954, p. 217-218.

Relation between inspection test results and the properties which are required to make an efficient design. (S general, Al)

282-S. (Russian.) **Devices for Determining Metal Shrinkage and Growth.** T. M. Smirnov. *Liteinoe Proizvodstvo,* 1954, no. 3, May-June, p. 16-17.

Design and performance. Table, diagrams, graphs. 5 ref. (S14)

283-S. (Russian.) **Ultrasound and Its Application.** S. Ia. Sokolov. *Priroda,* v. 43, no. 3, Mar. 1954, p. 21-34.

Methods of excitation and propagation, effect on substances; registration of physico-chemical processes, testing metals, and ultrasonic microscope. Photographs, diagrams. (S13, P10)

284-S. (Swedish.) **Standards of Gray Cast Iron.** M. Itzel. *Gjuteriet,* v. 44, no. 5, May 1954, p. 84-86.
Standard test bars and minimum tensile strengths required in various countries. Table. 7 ref. (S22, Q23, CI)

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Applications of Metals in Equipment

211-T. Your Product: How Light? How Small? How Compact? Alex E. Javitz. *Electrical Manufacturing,* v. 53, June 1954, p. 89-108.
Weight saving, space reduction and small size are challenges for engineer. Solutions vary from design principles, materials, components, fabrication and production techniques. Photographs, tables. 25 ref. (T general)

212-T. Hangar Doors of Aluminum Alloy. *Engineering,* v. 177, May 21, 1954, p. 658-659.
Construction of folding and sliding doors at London airport. Photographs, diagrams. (T26 Al)

213-T. Aluminum Die Castings in Telephone Equipment. L. Pederson. *Materials & Methods,* v. 39, June 1954, p. 98-100.
Economic, engineering and production factors. Photographs. (T1, Al)

214-T. Cast High Alloys for Heat Treating Equipment. *Metal Treating,* v. 5, May-June 1954, p. 6-7, 18.
Some applications, alloy selection and design. Photographs, diagrams, table. (T5, CI)

215-T. Evaluation of Test Data in Determining Minimum Design Requirements for Aluminum-to-Copper Connectors. D. C. Hubbard, R. W. Kunkle and A. B. Chance. *Power Apparatus and Systems,* 1954, no. 12, June, p. 616-625; disc., p. 625-628.
Design of various types of connectors. Plating requirements for corrosion protection. Tables, graphs, photographs. 15 ref. (T1, L17, Al, Cu)

216-T. Aluminium and Its Alloys in Industry. Packaging. J. A. Ambler. *Sheet Metal Industries,* v. 31, no. 326, June 1954, p. 538-539, 551 + 2 plates.
Uses of metal containers and foils. Photographs. (T10, Al)

217-T. Aluminium and Its Alloys in Industry. Aircraft Forgings. W. Morgan. *Sheet Metal Industries,* v. 31, no. 326, June 1954, p. 545-546.
Development of alloys, improvement in ingot and forging quality and reduction of residual stresses. Photographs. (T24, F22, Q25, Al)

218-T. Aluminium and Its Alloys in Industry. Electrical. C. H. E. Ridpath. *Sheet Metal Industries,* v. 31, no. 326, June 1954, p. 548-550.
Good conductivity, lightness and resistance to corrosion offer good usage in transmission lines. Photographs. (T1, Al)

219-T. Die Steels for Cold Extrusion. E. Johnson and E. Bishop. *Steel Processing,* v. 40, June 1954, p. 353-360, 391.
Quality, heat treatment, hardness and hardenability, resistance to tempering, toughness, abrasion resistance, ease of machining and grinding. Tables, graphs, micrographs. 14 ref. (T5, G5, TS)

220-T. (English.) **A Comparative Study of Cutlery Steels Containing Different Percentages of Iron Derived From Iron Sand.** Sadao Koshiba and Mitsuo Kikuta. *Hitachi Review,* 1954, no. 5, Feb., p. 107-111.
Three types of cutlery steel tested to determine conditions of transformation, thermal expansion coefficients and hardenability, carbide spheroidizing and heat treatment characteristics. Tables, graphs, micrographs. (T8, S5)

221-T. (German.) **The Aluminum Body of the New Dyna-Panhard.** J. J. Baron. *Aluminium,* v. 30, no. 5, May 1954, p. 183-194.
Design, operation, and production methods. Tables, photographs. (T21, Al)

222-T. (German.) **Light Metal Containers.** K. Muschard. *Aluminium,* v. 30, no. 5, May 1954, p. 195-199.
Advantages of light weight, high strength, low damage to contents and open-air storage. Photographs. (T10, Al)

223-T. (German.) **Experiences With Caromium-Vanadium Economy Tube Steels.** W. Herrmann. *Energietechnik,* v. 4, no. 1, Jan. 1954, p. 24-25.
Defects on chromium-vanadium steel boiler tubes. Methods for handling and welding. Diagram, photograph, table. (T26, K general, AY)

224-T. (German.) **Ceramic-Metal Resistance Materials for Electrical Engineering.** Alfred Schulze. *Umschau in Wissenschaft und Technik,* v. 54, no. 10, May 15, 1954, p. 293-295.
Fields of application. Graphs, table. (T1, H general)

225-T. Penetration of Various Packaging Films by Common Stored-Product Insects. Paul D. Gernardt and David L. Lindgren. *Journal of Economic Entomology,* v. 47, Apr. 1954, p. 282-287.
Tests of saran, pliofilm, polyethylene and metalplastic laminated films. Nontransparent laminated film containing aluminum foil as one of the laminae was respectively resistant to insect penetration but not insectproof. Photographs, tables. (T10, Al)

226-T. Atomic Age Develops New Uses for Light Metals. *Light Metal Age,* v. 12, June 1954, p. 12-13, 39.
Miscellaneous applications of beryllium, aluminum alloys and cermets in nuclear reactors. Diagrams. (T25, Be, Al, C-n)

227-T. Commercial Sand-Cast Magnesium Applications. R. M. Burns. *Light Metals,* v. 17, June 1954, p. 201.
Uses in logging trailers, sawmills, farm machinery, hand tools and mine hoists. Table. (T4, T3, T6, T28, Mg)

228-T. "Mechanical World" Flowsheet—No. 246. Germanium Rectifiers—Manufacture and Testing. J. Zeelander, compiler. *Mechanical World and Engineering Record,* v. 134, June 1954, p. 262-263.
Properties and uses of germanium diodes. Flowsheet, diagram, photographs. (T1, Ge)

229-T. Properties of Light Springs. B. Coates. *Metal Treatment and Drop Forging,* v. 21, June 1954, p. 284-288.
Physical and fatigue properties of spring steels. Specifications for nonferrous springs. Tables, diagram. (T7, SG-b)

230-T. Selection and Heat Treatment of Tool and Die Steels. III. Howard E. Boyer. *Modern Machine Shop,* v. 27, July 1954, p. 206 + 12 pages.
Applications for nine classes of toolsteels. Table, micrographs, graph. (T6, J general, TS)

231-T. Aluminum in Truck Body Construction. E. P. White. *Modern Metals,* v. 10, June 1954, p. 52, 54-56.
Aluminum offers substantial economies in terms of increased pay load and lower maintenance costs. Diagram, photographs, table. (T21, Al)

232-T. Metallic Staple—Can You Spin It? *Textile Industries,* v. 118, July 1954, p. 76-81.
Methods of spinning blends of metallic and cotton, wool or synthetic fibers. Photographs, table. (T10, Al)

233-T. (German.) **Monocrystals of Germanium for Production of Transistors.** H. Salow and A. Hähnlein. *Fernmeldetechnische Zeitschrift,* v. 7, no. 5, May 1954, p. 235-241.
Production, properties and use. Graphs, photographs, diagrams. 8 ref. (T1, Ge)

234-T. Metal Cans of the Future. R. H. Lueck, K. W. Brighton and R. W. Pilcher. *American Paint Journal,* v. 38, July 12, 1954, p. 22, 24, 26.
Alternates for tin plate, including untinned steel, specially treated steel, aluminum and steel coated with aluminum, zinc and possibly nickel. Brief comments on developments in coating and cementing. (T10, L general, Sn, ST, Al)

235-T. Liquid Metal for Power Reactors. *Chemical and Engineering News,* v. 32, July 12, 1954, p. 2772, 2774, 2776.
Liquid metal fuels appear best approach to competitive power reactor. Molten solution of U^{233} in bismuth looks promising for use as nuclear reactor fuel. (T25, U, Th)

236-T. (Czech.) **Production Technology of Bimetallic Strips for Thin-Walled Babbitt Bearings.** Vladimir Suchanek. *Hutnické Listy,* v. 9, no. 5, 1954, p. 280-288.
Production methods and results of various metal combinations. Adhesion of bimetallic components. Graphs, photographs, micrographs, diagrams. 25 ref. (T7, AY, Cu, Sb, Sn)

237-T. (Russian.) **Manufacture and Use of Iron-Graphite Bearings for Rollers of Coal Conveyers.** P. V. Semencha. *Vestnik Mashinostroenia,* v. 33, no. 12, Dec. 1953. p. 66-69.
Production methods and wearing characteristics. Diagrams, graphs, micrographs. (T28, H general, Q9, Fe)

238-T. (Pamphlet.) **Aluminium and Its Alloys in Building.** 1953, 76 p. Aluminium Development Association, 33 Grosvenor Street, London, W. 1, England. 3S.6d.
Examples of structural and decorative uses. (T26, Al)

V
Materials
General Coverage of Specific Materials

203-V. Heavy Alloy in Full Production. *Engineering,* v. 177, May 21, 1954, p. 670-671.
Properties, production and uses of tungsten-base G.E.C. alloy. (W)

204-V. Tool Steel. A. J. Blackwell. *Iron & Steel,* v. 27, June 1954, p. 217-222.
Shop metallurgical control by a small user. Tables, graphs, micrographs, diagrams. (S general, TS)

205-V. Aluminium and Aluminium Alloys. E. G. West. *Sheet Metal Industries,* v. 31, no. 326, June 1954, p. 515-531, 536 + 2 plates.
Availability, specification and use

in modern engineering and industrial practice. Graphs, tables, photographs. 32 ref. (Al)

206-V. Fortiweld. H. F. Tremlett. *Welding and Metal Fabrication,* v. 22, June 1954, p. 221-226.

A new development in weldable high-tensile steel. Mechanical properties, heat treatment, machinability, formability, welding behavior and applications. Tables. (AY)

207-V. (French.) Titanium and Titanium Alloys. A. Saulnier and R. Syre. *Revue de métallurgie* v. 51 no. 5 May 1954 p. 293-304.

Theoretical principles and mechanical properties. Methods used in developing industrial product. Graphs, micrograph. 2 ref. (Ti)

208-V. (German.) Rating of Bearing Materials. Summary of Material Characteristics. H. Stephan. *VDI Zeitschrift des Vereines deutscher Ingenieuer* v. 96 no. 14, May 11, 1954, p. 403-409.

Comparison of tin, antimony, lead, magnesium, aluminum, copper, silver, cadmium and zinc-base alloys. Tables, graphs. 8 ref. (SG-c)

209-V. Aluminum 355. (Heat Treatable Aluminum Casting Alloy). *Alloy Digest, no.* Al-18, July 1954.

Composition, physical constants, properties, heat treatment, machinability, weldability and general characteristics. (Al)

210-V. Berylco 20CR. (Beryllium-Copper). *Alloy Digest, no.* Cu-18, July 1954.

Composition, physical constants, properties, heat treatment, machinability, weldability, corrosion resistance, pickling, high and low-temperature characteristics and general characteristics. (Be, Cu)

211-V. Elektron-TZ6. (High Strength Casting Alloy). *Alloy Digest, no.* Mg-10, July 1954.

Composition, impurities, physical constants, properties, machinability, surface treatment, corrosion resistance and general characteristics. (Zn, Mg)

212-V. AISI-8740. (Nickel-Chromium-Molybdenum Alloy Steel). *Alloy Digest, no.* SA-21, July 1954.

Composition, physical constants, properties, heat treatment, machinability, weldability and general characteristics. (AY)

213-V. Karthal-A. (Resistance Alloy). *Alloy Digest, no.* SS-16, July 1954.

Composition, physical constants, properties, weldability, corrosion resistance and general characteristics. (SG-q, Cr, Fe)

214-V. Ti-140A. (Titanium-Base Alloy). *Alloy Digest, no.* Ti-5, July 1954.

Composition, physical constants, properties, heat treatment, machinability, workability, weldability, corrosion resistance and general characteristics. (Ti)

215-V. Atlas 93. (Shock Resisting Tool Steel). *Alloy Digest, no.* TS-22, July 1954.

Composition, properties, heat treatment, machinability and general characteristics. (TS)

216-V. Rock-Drilling With Hard Metals. II. E. J. Sandford and J. R. Wiles. *Alloy Metals Review,* v. 8, June 1954, p. 2-8.

Characteristics of hard metals and production of bits. Micrographs, photographs. (T6, EG-d)

217-V. Cast Alloy Reference Sheet. N. S. Mott. *Chemical Engineering Progress,* v. 50, June 1954, p. 324.

Composition; applications, mechanical and physical properties and corrosion resistance of corrosion and galling-resistant 19-10-3-2-3 chromium-nickel-molybdenum-copper-silicon hardenable alloy. Tables. (SS)

218-V. Alkali Metals: Launched Into a New Era. Marshall Sittig. *Chemical Week,* v. 74, June 26, 1954, p. 47-54.

Physics, chemistry, economics and applications of lithium, sodium, potassium, rubidium and cesium. Photographs, graphs, tables, map. (EG-e, Cs, K, Li, Na, Rb)

219-V. Ductile Iron. G. R. Brophy. *Electrical Manufacturing,* v. 54, July 1954, p. 91-95, 301.

Heat treatment, machinability, mechanical and physical properties, corrosion resistance and applications. Micrographs, photographs, graphs, tables. 3 ref. (CI)

220-V. Titanium Seminar. John Alico. *Light Metal Age,* v. 12, June 1954, p. 16 + 4 pages.

Properties, applications, welding, forming and machining. Photographs. (Ti)

221-V. Titanium Groupings. *Light Metal Age,* v. 12, June 1954, p. 24-25.

Advantages and disadvantages in use, forming and heat treating alpha, alpha-beta, unstable beta and stable beta alloys. Tables. (Ti)

222-V. (Polish.) Research on Bearing Alloy LCa. S. Balicki. *Prace Instytutow Ministerstwa Hutnictwa,* v. 6, no. 2, 1954, p. 90-97.

Hardness and friction coefficient of lead-calcium alloy. Production methods. Tables, graphs, micrographs. 11 ref. (Pb)

223-V. Nodular Cast Iron, Its Present Position and Future Prospects as an Engineering Material. With Special Reference to Its Suitability for Crankshafts. S. B. Bailey. *Chartered Mechanical Engineer,* v. 1, Apr. 1954, p. 208-210.

History, properties, casting behavior and applications. (T7, CI)

224-V. The 3Mn Complex—New Titanium Alloy. R. J. Kotfila and C. M. Wayman. *Product Engineering,* v. 25, July 1954, p. 172-174.

Properties, fabrication and future possibilities of titanium-3% manganese alloys. Tables, graph, photograph. (Ti)

225-V. The Place for Vanadium. *Steel,* v. 135, July 12, 1954, p. 128-130.

Mechanical and physical properties, workability and machinability of vanadium and its alloys. Graphs, table. (V)

226-V. (Book.) The Commercially Important Wrought Copper Alloys. 124 p. 1953. Chase Brass & Copper Co. Inc., Waterbury 20, Conn.

Properties, uses, forms, and sizes available in copper, brasses and bronzes. (Cu)

227-V. (Book.) Copper. The Metal, Its Alloys, and Compounds. Allison Butts, editor. ACS Monograph 122. 936 p. 1954. Reinhold Publishing Corp., 330 W. 42nd St., N. Y. 18. $20.00.

Includes "The background of the Copper Industry", Lawrence Addicks; "Copper Minerals, Ores and Ore Deposits", E. N. Pennebaker; "The Concentration of Copper Ores", Frank L. Bosqui, Donald Dyrenforth and Alexander D. Marriott; "Roasting, Smelting, and Converting", W. B. Boggs; "Anode Furnace Refining", Richard Baier and Michael B. Kushma; "Copper Slags and Mattes", Carle R. Hayward; "Thermodynamics of Copper Smelting", E. A. Peretti; "Electrolytic Copper Refining", C. W. Eichrodt and J. H. Schloen; "Cathode Melting and Casting of Marketed Copper Shapes", R. H. Waddington; "Induction Melting of Copper and Copper Alloys", Manuel Tama; "Treatment of Electrolytic Copper Refinery Slimes". J. H. Schloen and E. M. Elkin; "The Fire Refining of Copper", H. J. Miller; "The Hydrometallurgy of Copper", J. George Grunenfelder; "Commercial Forms of Copper Products", Sidney Rolle; "Copper and Copper-Base Powders", Paul E. Wengart; "Secondary Copper and Copper Alloys", Ray Cochran; "The Physical Properties of Copper", J. S. Smart, Jr.; "Chemical Properties and Corrosion Resistance of Copper and Copper Alloys", P. T. Gilbert; "The Effect of Impurities in Copper", J. S. Smart, Jr.; "The Physical Chemistry of Copper", D. W. Wakeman; "The Isotopes of Copper", John Kronsbein and Ralph H. Firminhac; "Phase Diagrams of Copper Alloy Systems", R. M. Brick; "Magnetic Properties of Copper and Copper Alloys", Allison Butts; "Copper-Base Foundry Alloys", William Romanoff, F. L. Riddell and G. P. Halliwell; "Wrought Copper Alloys", V. P. Weaver; "Copper as an Alloying Element", Webster Hodge; "The Melting and Casting of Copper-Base Alloys", William Romanoff, F. L. Riddell and G. P. Halliwell; "Hot Working of Copper and Copper Alloys", Frank F. Poland; "Cold Working of Copper and Copper Alloys", W. T. Toussaint; "Heat Treatment of Copper and Copper-Base Alloys", E. M. Manning; "Machining Characteristics of Wrought Copper and Copper Alloys", Henry Burgnoff; "Welding, Brazing, Soldering, and Cladding of Copper and Its Alloys", A. N. Kugler; "Production and Use of Copper", D. K. Crampton; "Copper and Copper Alloys in the Electrical Industry", I. V. Williams; "Copper in the Building Industry", T. E. Veltfort; "Automotive Applications of Copper and Copper Alloys", E. W. Upham; "The Use of Copper and Copper Alloys in Ordnance", A. L. Jamieson; "Copper and Copper-Zinc Alloy Plating", A. Kenneth Graham; "The Simpler Inorganic Compounds of Copper", A. J. Barnard, Jr.; "Copper as an Agricultural Fungicide", J. D. Wilson; "Cupreous Powder and Its Applications", Dean S. Hubbell; "Copper in Organic Chemistry", Robert A. Benkeser and Henry Gilman; "Copper in Biology", Francis F. Heyroth and Jacob Cholak; "Copper in the Production and Nutritional Quality of Crops", Kenneth C. Beeson; "Metallography of Copper and Its Alloys", Franklin H. Wilson; and "The Analytical Chemistry of Copper", E. Leininger. (Cu)

228-V. (Book.) Titanium and Titanium Alloys. John L. Everhart. 184 p. 1954. Reinhold Publishing Corp., 330 W. 42nd St., New York 18. $3.00.

Properties of commercial titanium and its alloys, heat treatment, forming and fabricating, joining, machining and grinding, cleaning and finishing, and applications. (Ti)

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METALLURGIST: Young, recent graduate with B.S. or M.S. in metallurgy for development work in tungsten, molybdenum, etc. Location, northern Pennsylvania. In reply give training, experience, age, salary desired, etc. Box 8-10.

METALLURGIST: Experienced, over 35, needed. Technical and executive experience to administer laboratory and conduct technical service to customers and sales and production departments of tube mill producing stainless and high alloy welded tubing. Write: Carpenter Steel Co., Alloy Tube Division, Union, N. J., Attention: Personnel Director.

METALLURGIST or MECHANICAL ENGINEER: Expanding research and development program of large nonferrous fabricating concern creates opportunity for men under 35 with initiative and supervisory potential. Openings in several types of work—physical metallurgy, development, miscellaneous testing, plant methods. Firm produces copper and aluminum alloys. New York State. Box 8-15.

METALLURGICAL CHEMIST: Established producer of chemical products for metal treatment desires chemist with specialized experience in physical metallurgy. Strong inorganic background required. Knowledge of heat treatment processes, inorganic surface treatments, or metal deformation and cutting lubricants desirable. Under 35. Middle Atlantic location. Opening available promptly. Salary commensurate with attainment, experience and responsibilities. Box 8-20.

METALLURGISTS: Naval Air Material Center needs metallurgists with experience in corrosion and/or electroplating, to supervise small group of chemists and metallurgists engaged in research and development work on aircraft materials (salary $5940 or $7040 per annum, depending upon experience). WELDING METALLURGIST: To be responsible for development projects in resistance, gas-shielded metal and inert arc welding or aircraft metals and alloys (salary $5940 per annum). Interested persons should file application for Federal Employment, Standard Form 57, with the Industrial Relations Department, Naval Air Materials Center, U. S. Naval Base, Philadelphia 12, Pa. Applications may be obtained at above address or at any first or second-class post office.

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SALES ENGINEER: With casting and heat treating experience, for established northeastern metallurgical business. Territory Western Massachusetts, Eastern New York State, and Northern Massachusetts, New Hampshire and Maine. Box 8-125.

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METALLURGISTS: Alloy development. Includes composition development for high-temperature and magnetic alloys, phase diagrams, creep, precipitation hardening, vacuum melting and other techniques. Development experience in physical metallurgy or alloy systems, background in theoretical physical metallurgy and knowledge of solid state physics useful. M.S. or Ph.D. in metallurgical engineering desired. For application write to: Westinghouse Electric Corp., Educational Department, East Pittsburgh, Pa.

METALLURGIST: Graduate with not more than five years experience in industry. Work will include shop problems, and development and experimental projects in connection with carbon and low alloy steels and high-temperature alloys. Must have good background in English and be able to write good reports. Box 8-25.

METALLURGIST: Excellent opportunity for young man with medium-size manufacturer of power-plant equipment. Wide variety of problems in ferrous and nonferrous metallurgy. Some welding or iron foundry experience helpful. Box 8-130.

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METALLURGISTS: With aptitude and interest in research or development in field of aluminum alloys. Good physical metallurgy background necessary. Positions open for group leader for which experience with aluminum is desirable though not necessary. Position also open for research engineer in physical metallurgy. Salary commensurate with qualifications. Reply to: Kaiser Aluminum and Chemical Corp., Department of Metallurgical Research, Physical Metallurgy Section, Spokane 69, Wash.

POSITIONS WANTED

PHYSICAL METALLURGIST: Ph.D. degree, age 30, married, children. Seven years diversified experience in industry and research, four years in ferrous metallurgy, two years part-time teaching, three years research on light metals. Seeks responsible position in research or development which will take full advantage of training and experience. West Coast preferred. Box 8-30.

METALLURGIST: Doctorate, 38, married. Ten years experience in research, development and teaching combined. Good theoretical background. Research experience includes physical chemistry of metallurgical reactions, martensite transformation, fracture of metals, internal fraction, X-ray diffraction. Desires research and development position in industry or teaching and research position in university. Location immaterial. Box 8-35.

METALLURGICAL ENGINEER: B.S. degree, age 39, married, two children. Broad experience in automotive parts manufacturing includes foundry control, heat treating, plating, laboratory supervision, process development, material specifications, customer contacts, quality control, machining and product research. Desires permanent position in research, production or technical sales. Complete resume available. Box 8-40.

METALLURGICAL ENGINEER: B.S. degree, age 26, family. Two years professional experience in industrial research and development with well-known laboratory. Undergraduate experience in nonferrous foundry and fabrication processes as research technician as well as some steel mill experience. Wants permanent position in area where rural living is possible. Box 8-45.

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METALLURGICAL ENGINEER: B.S. degree, age 33, married, family. Four years experience includes two years in wire mill working in metallography, heat treating, tensile testing, corrosion testing, letter and report

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METALLURGIST: With six years experience in development and research work desires teaching position in large university. B.S. and M.S. degrees in metallurgical engineering. Box 8-65.

METALLURGICAL EXECUTIVE: B.S. and M.S. degrees, family. Desires administrative position with responsibility utilizing 20 years background in directory laboratory and plant control of stamping, forging, casting, plating, welding, machining, heat treatment, material and process specifications and inspection systems including quality control, X-ray, reflectoscope, magnaflux, zyglo and stress coat. Prefers Ohio or Detroit area. Box 8-70.

PHYSICAL METALLURGIST: Ph.D. degree, age 29, married. Experience includes 2½ years part-time teaching and 3 years fundamental and industrial research. Prefers academic position with opportunity for part-time research. Box 8-75.

METALLURGICAL ENGINEER: B.S. degree, age 30, married. Four years experience includes all types of heat treating, both ferrous and nonferrous, two years foundry experience. Production, laboratory and supervisory background. Familiar with aircraft materials and elevated temperature alloys. Detroit area preferred. Box 8-80.

METALLURGIST: B.S. degree, family, age 31. Five years diversified experience includes 1½ years foundry metallurgy and balance ferrous and nonferrous metallurgical control and development in manufacturing plant, involving physical and nondestructive testing, metallography, material substitutions, vendor contact, and solution of production problems. Desires to relocate in Midwest, preferably Ohio. Box 8-85.

METALLURGIST: B.S. degree, age 28, family. Four years experience in research and development of titanium alloys and aluminum-base casting alloys. Additional experience in chemistry, spectrography and polarography. Supervised additional personnel. Experience and ability for responsibility in production or development. Box 8-90.

METALLURGICAL ENGINEER: B.S. degree, married. Four years experience in general metallurgical problems, powder metal development and some magnetic alloy experience. Desires research or development position in eastern part of country. Box 8-95.

PHYSICAL METALLURGIST: Will complete requirement toward Ph.D. in fall. Age 29, married, family. Desires responsible position in industrial research and/or development. Will consider teaching and academic research. Three years experience in university research with emphasis on transformations and oxidation. Sound background in physical, mechanical and chemical metallurgy. Box 8-135.

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High Speed 17-22AA-10	1700 - 2300°F.
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